

JUL 18 1941

JULY 17, 1941

The **IRON AGE**



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This Week in The Iron Age

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The Iron Age

○ ○ ○
JULY 17, 1941

○ ○ ○
ESTABLISHED
1855



House Without a Door

YOU have heard of buildings without windows. Have you ever heard of a house without a door?

Once upon a time there was a community of ants; a very industrious and peaceful community. The members of it went about their business of building homes and storing them with food for their families. There was never any thought of invading a neighbor's territory or of making war on adjacent ant colonies.

But there came a time when the peaceful pursuits of this ant colony were interrupted. For one of the members who had returned from an extended journey in search of dead flies and grasshoppers, reported having seen the advance column of an army of white ants. And the march of this army was directly toward the peaceful home colony.

Immediately there was great alarm, scurrying back and forth and much consultation among the leaders. For the "geschicklichkeit" of the white ants was well known and the black ant colony was totally unprepared.

A defense program was at once set up. The ant defense council decided that it would be futile to fight since the white ants were provided with much superior mandibles. The decision, therefore, was to build an impregnable house in which the colony could take refuge until the invading army had passed on.

Tremendous activity then ensued. Ants rushed here and there, hither and yon, back and forth and to and fro in response to orders from the defense council. Some carried materials and the remainder built them into walls. There was no let-down or stopping for rest and work was continued 24 hours a day.

Finally the strong house was completed. And then and only then did the community relax. But not for long. For to the consternation of all, it was suddenly discovered that in the haste and hurry they had forgotten to provide the house with a door.

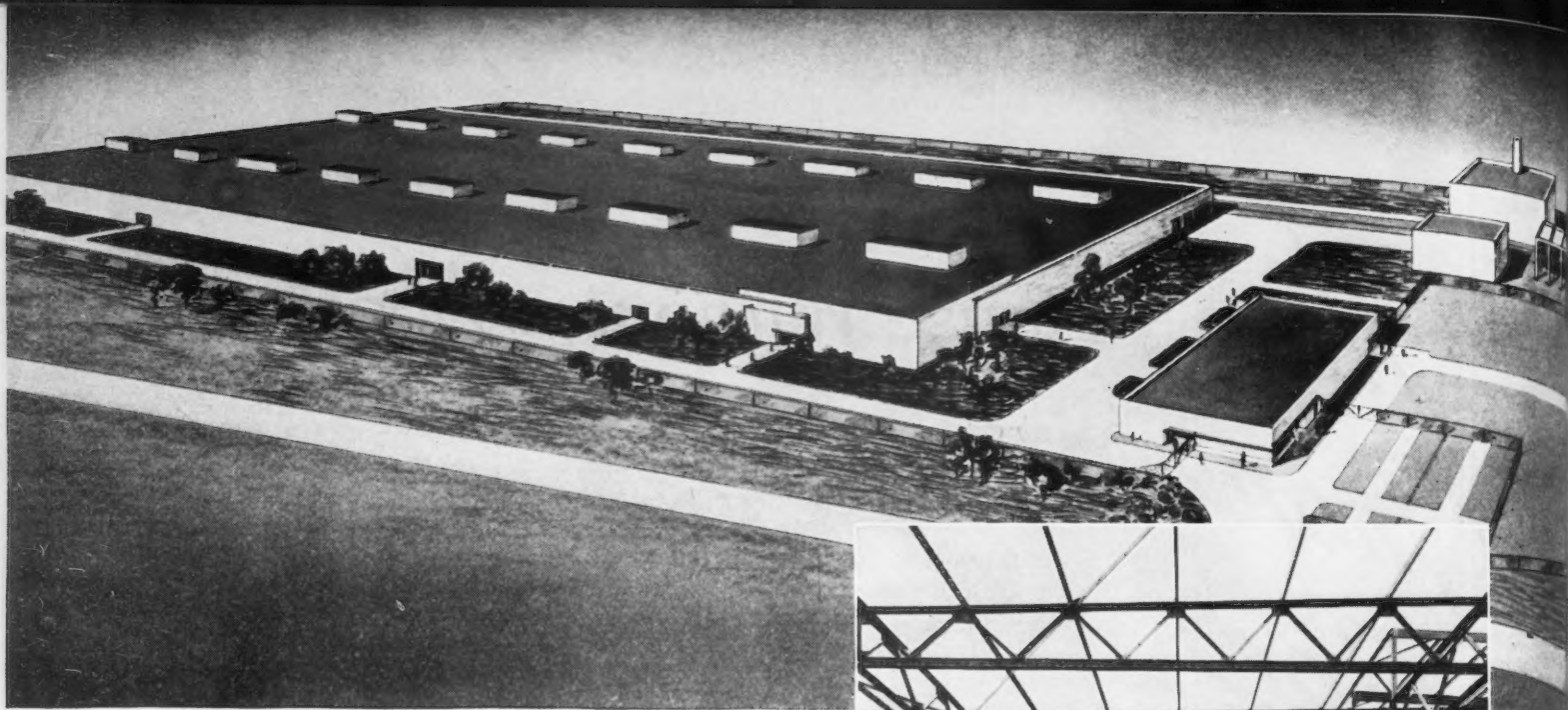
And that was the end of the ant colony!

To point a moral that may be apropos, consider the following: Machine tools are useless without an adequate and continuing supply of small tools. You cannot cut metal without drills, reamers, taps, dies and cutting tools.

Machine tool capacity has increased five or six times in four years. Small tool capacity has not much more than doubled.

There is no use building a house without a door!

Joe VanDunten



This new Studebaker plant will have 600,000 sq. ft. of floor space, and when operating at capacity its four thousand workers will be turning out parts for production of two engines per hour. It is one of three Studebaker defense plants now nearing completion.

Inland's No. 1 Job: National Defense

IN common with the vast majority of American industry, every phase of Inland's business is geared to one great purpose—National Defense. It is our No. 1 job! Our mills are making new production records; our schedules are being constantly made and re-made so that the steel for our Country's Defense may be delivered when and where needed.

Typical of this is the new Studebaker Airplane Motor Part Plant illustrated above. Late one evening Studebaker officials notified Inland that this plant was to be built and that time was



the important factor. Inland's help was needed along with others. The orders reached us January 28, 1941. Schedules were revamped, deliveries began February 7 and were completed February 27. This is what Inland is doing daily to aid in the great program in which our nation is engaged.

However, we also have a No. 2 job. Defense comes first; after that, all our efforts are directed toward an equitable distribution of our remaining production so that we may, to the best of our ability, serve the many friends whose business has been responsible for the development and growth of our company.

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STAINLESS STEEL—

1940—An autopsy of a banner year. For the first time a complete probing of relative popularity of stainless analyses and grades, geographical distribution and ultimate application. All based on individual reports from 83.2 per cent of the 4960 consumers of these alloys.

By T. W. LIPPERT
*Technical Editor,
The Iron Age*

TODAY, with the blast of war blowing in its ears, the stainless steel industry almost affectionately recalls the hallowed quiets of the first three quarters of 1940, when competitive throat cutting followed time-honored patterns, salesman had to scratch around for orders, and even a faint squawk from a lowly consumer made a first vice-president scamper. All that is changed now. Stainless is a most important sinew of war. The stainless industry is now a febrile industry, with more business being turned down than is being accepted, with 1941 production likely to double that of the record 1940 year, with capacity tumid under the repetitive impacts of an all-out defense effort.

With the end of this effort still far in the future, little time is being lost worrying about the bleak problems of the post-war period. Some producers are shoring up their individual positions by means of delays in the exploitation of

minor technical developments. All producers well realize that the normal growth of their industry is being tremendously accelerated, that all this new capacity will at some future time force stainless into many hitherto untapped outlets at prices far under those prevailing in the past.

Most of the year 1940 followed the growth pattern set in the preceding few years, with an added fillip in the last quarter when defense demands started to throb. The investigation of 1940 activities by THE IRON AGE was carried out along the lines of the previous year's survey, by going to each consumer individually for his purchases by grade and by analyses, with supplementary data on the final use of the steel.

By checking with the customer lists of three large producers, many hundreds of new names were added to THE IRON AGE master list of stainless consumers. These new names represented the normal trend in the growth of the industry plus a number of new companies calling for stainless for various defense items. The final list, 4960 names in all was canvassed, and the response

was eminently satisfactory. Of the total, 87 companies had gone out of business, 4127 answered the inquiry, and 746 failed to answer despite several follow-up letters. Of the 746, only three were known large consumers, and consumption of these three was estimated on the basis of known sales to them by producers. Total consumption data were adjusted by a simple proportionality to include the 743 unknown accounts and secure a 100 per cent consumption figure.

A collocation of the figures—which ranged individually from a few pounds to many hundreds of tons—disclosed some interesting results. There is continued retrogression in sheets vis-à-vis strip, and bars and rods retain the prominent position established a few years ago. The 18-8 analysis, as always, is first as regards popularity, accounting for almost 50 per cent of the 1940 consumption, with 16-18 straight-chromium and 12-14 straight-chromium second and third, respectively, in demand.

Complete breakdowns of the 1940 consumption survey are shown in Tables I, II and III. Table IV breaks down the 1939 and 1940 fig-

TABLE I
Consumption* of Finished Corrosion and Heat-Resisting Steels—1940
(In Net Tons)

Product	Analyses Groups, Per Cent Composition							Total Consumption, All Analyses
	18% Cr. & 8% Ni	16% Cr & 2% Ni	25% Cr & 12% Ni	12% to 14% Cr	16% to 18% Cr	18% to 30% Cr	All Others (Cr and Cr+Ni)†	
Sheets	19,347	826	666	673	2,890	373	7,965	32,740
Bars and heavy rods ..	5,055	53	1,339	6,264	4,999	80	17,386	35,176
Strip (hot & cold rolled)	34,476	363	1,863	1,847	20,612	87	3,832	63,080
Tubular goods	3,969	...	40	280	96	207	2,204	6,796
Plates and shapes	3,152	...	108	95	383	141	669	4,548
Wire and wire rods...	5,762	39	220	1,526	4,977	79	1,892	14,495
Forgings	1,098	174	2,208	1,825	105	85	303	5,798
TOTAL	72,859	1,455	6,444	12,510	34,062	1,052	34,251	162,633

*These figures based on returns from an estimated 83.2 per cent of all known consumers of these types of alloys—figures shown are adjusted to 100 per cent consumption. Exports also included herein.

†These figures include undistributed tonnages in the analyses groups at the left as well as special analyses not warranting individual listing.

TABLE II
Consumption* of Corrosion, Wear and Heat-Resisting Castings—1940
(In Net Tons)

18% Cr & 8% Ni	16% Cr & 2% Ni	25% Cr & 12% Ni	12% to 14% Cr	16% to 18% Cr	18% to 30% Cr	All Others† (Cr & Cr+Ni)	Total Consumption, All Analyses
1,325	12	1,910	608	401	426	7,141	11,823

*These figures based on returns from an estimated 86 per cent of all known consumers of these types of alloy castings—figures shown are adjusted to 100 per cent consumption.

†Two major heat-resisting analyses in this group are the 35 Ni-15 Cr and the 60 Ni-12 Cr alloys, which accounted for about 1700 tons and 890 tons respectively in 1940. In the "all others" group there is in all about 3600 tons of heat resisting analysis, the remainder of the tonnage being made up by miscellaneous compositions, the bulk containing less than 16 per cent chromium.

ures both as to product and analyses. Comparative figures from producer surveys of previous years are also given in this table, although certain sections of those previous surveys are now considered of questionable accuracy.

The graphs on page 42 pictorially represent the entire history of stainless steel in the United States, from the first adolescent self-assertion in 1930, to the nadir of 1932, thence the steady climb to progressively new high levels in the following years. The dotted line on the graph is an estimate based on current consumption—all indications are that 1941 will be the really climacteric year in stainless, with consumption likely to double if the raw material situation permits. The small graphs on page 42 pictorialize the percentage popularity of various grades over the past years. Most significant are the shifts indicated for sheets, strip, and bars and rods.

As last year, consumption data submitted by consumers in 1940 were in the form of *finished steel*. Therefore, some scheme of reversed conversion had to be devised to show these figures in the form of ingots, so that performance can be

TABLE III
Production of Stainless and Heat-Resisting Ingots and Castings in the United States (1929-1940). By Analysis Groups.*
(In Net Tons)

	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939†	1940‡
Ingots:												
18 Cr and 8 per cent Ni.....	21,074	32,867	14,740	9,209	19,620	24,518	30,114	45,800	55,011	43,129	76,332	118,663
16 Cr and 2 per cent Ni.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,370
25 Cr and 12 per cent Ni.....	.....	.....	.....	.....	.....	.....	3,827	5,530	6,423	(?)	7,342	10,495
12 to 14 per cent Cr.....	14,552	8,821	5,397	4,900	7,401	9,470	15,220	25,430	30,186	13,429	15,135	20,375
16 to 18 per cent Cr.....	10,127	7,995	7,483	6,751	4,969	8,787	14,101	21,478	28,500	16,454	35,506	55,476
18 to 30 per cent Cr.....	.....	.....	.....	.....	.....	.....	1,606	1,022	1,615	(?)	937	1,713
All others (Cr and Cr-Ni)**.....	2,950	4,792	3,438	3,312	5,262	8,832	6,713	2,900	5,107	22,942	38,084	55,783
Not allocated	187	474	622	660	.....	.....	.....	.....	.....	.....	.....	.....
Total	48,890	54,949	31,680	24,832	37,252	51,907	71,581	102,160	126,842	95,954†	173,336	264,875
Castings:												
18 Cr and 8 per cent Ni.....	310	271	225	384	352	387	446	874	1,165	578	1,204	1,325
16 Cr and 2 per cent Ni.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12
25 Cr and 12 per cent Ni .....	.....	.....	.....	.....	.....	.....	760	1,280	1,430	612	1,293	1,910
12 to 14 per cent Cr	18	15	29	23	36	86	113	96	108	276	551	608
16 to 18 per cent Cr.....	156	96	192	237	225	164	288	295	332	261	375	401
18 to 30 per cent Cr.....	.....	.....	.....	.....	.....	.....	208	186	262	123	298	426
All others (Cr and Cr-Ni)**.....	3,326	2,930	2,264	1,257	2,126	3,036	2,173	3,170	4,702	2,180	5,925	7,141
Not allocated	1,392	1,009	511	285	54	201	83	.....	.....	.....	.....	.....
Total	5,202	4,321	3,221	2,186	2,793	3,874	4,071	5,901	7,999	4,030	9,646	11,823
GRAND TOTAL (ingots and castings)	54,092	59,270	34,901	27,018	40,045	55,781	75,652	108,061	134,841	99,984	178,290	276,698

† American Iron and Steel Institute figures. Does not include low-alloy valve steels covered in various IRON AGE surveys.

‡ Converted from consumption survey as explained in text; 1939 and 1940 figures adjusted to include exports.

* Analyses groups are approximate; in several classifications each element may vary as much as ± 2 per cent from the range shown, or may contain other elements such as molybdenum. In the case of *castings* a sizable percentage of the tonnage in any of the straight-chromium classifications may contain from 0 to several per cent nickel.

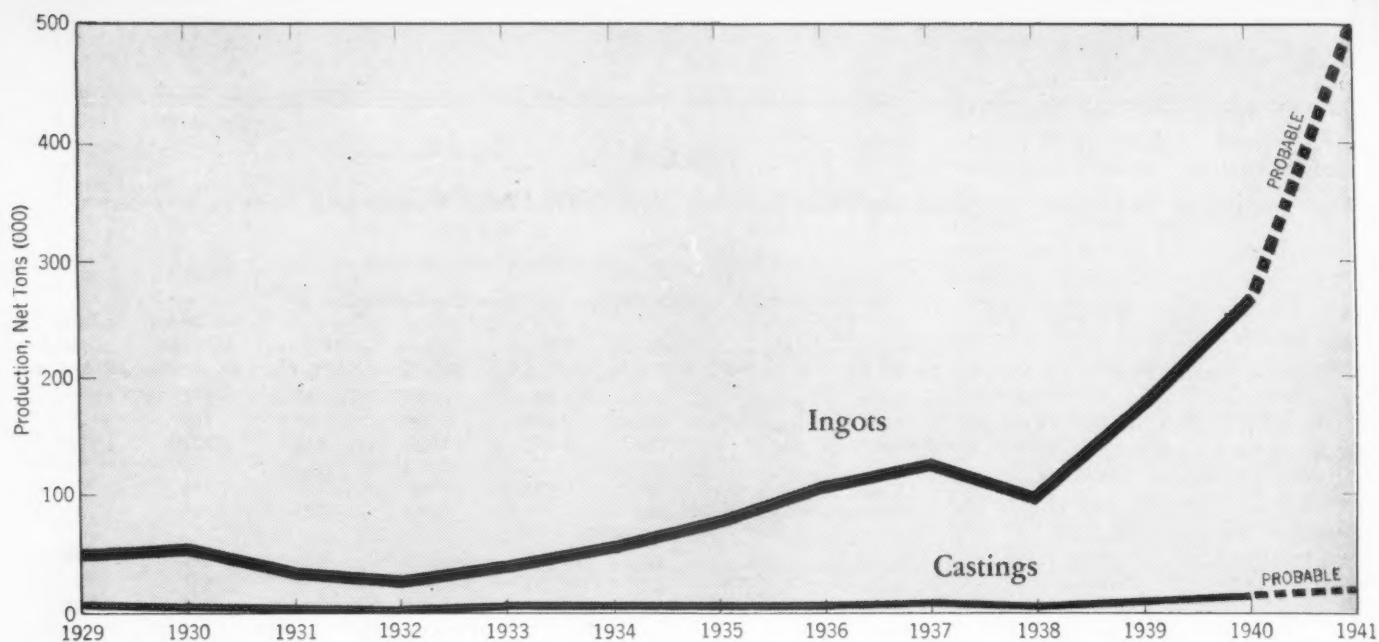
** This "catch-all" contains many analyses groups: In *finished steel* there are included such analyses as 4 to 6% Cr, 25 Cr-20 Ni, 5 to 8% Cr, 15 Cr-35 Ni, etc.; For *castings*, by far the three most prominent are the important heat-resisting analysis 33-36 Ni and 15-17 Cr; the popular analyses in the range 60+ Ni and 10-17 Cr; and the slightly less important analysis group 36-40 Ni and 18-20 Cr. In 1940 the 35 Ni-15 Cr and 60 Ni-12 Cr groups accounted for 1700 tons and 890 tons respectively.

TABLE IV
Production of Finished Corrosion and Heat-Resisting Steels (1935-1940). Product and Analysis Breakdown
(In Net Tons)

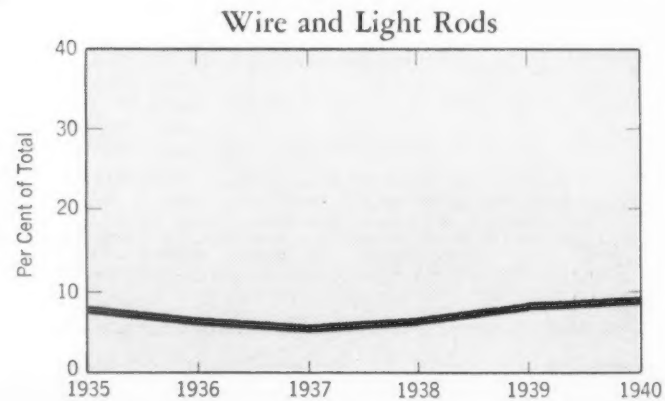
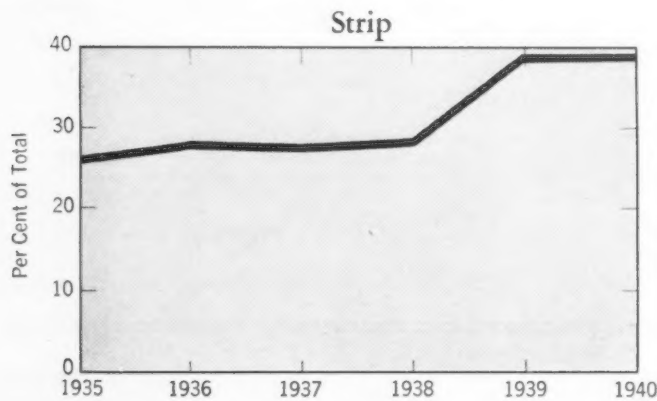
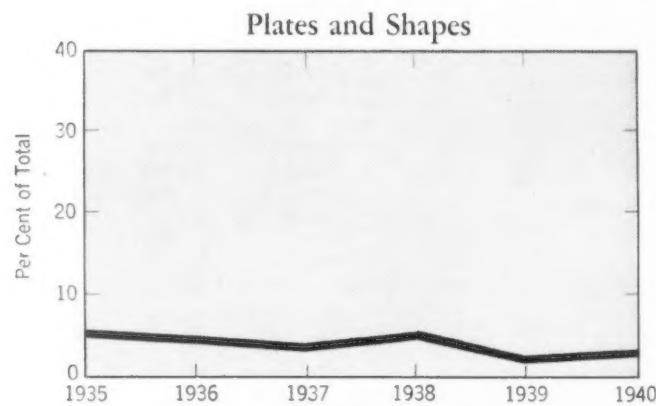
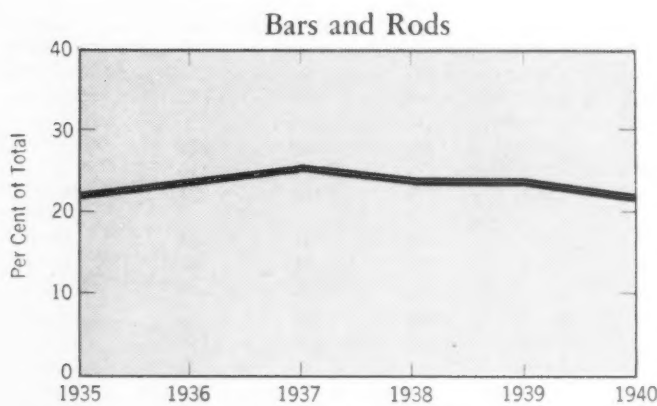
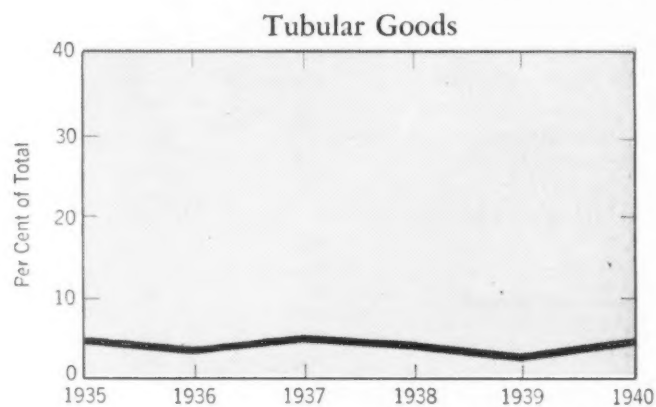
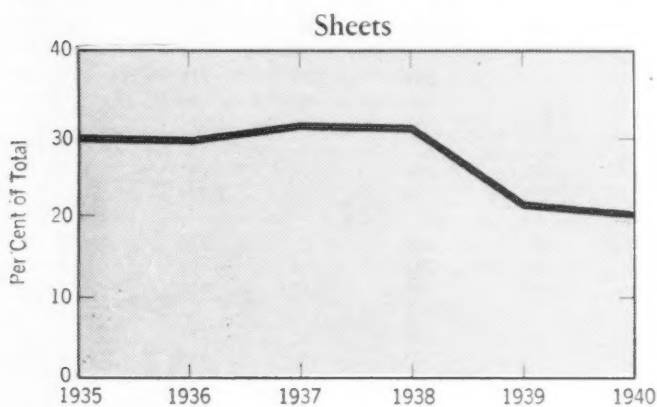
Type of Finished Steel		Analysis Groups, Per Cent Composition†						All Others (Cr and Cr + Ni)	Total Out- put, All Analyses
		18% Cr & 8% Ni	16% Cr & 2% Ni	25% Cr & 12% Ni	12% to 14% Cr	16% to 18% Cr	18% to 30% Cr		
Sheets	1935	6,486	....	412	1,480	3,253	56	373	12,060
	1936	9,212	....	943	3,521	3,508	154	269	17,607
	1937	12,652	....	1,586	3,284	4,562	213	1,223	23,520
	1938	....	....	....	....	....	....	....	17,407
	1939	13,162	....	105	622	1,705	22	7,116	22,732
	1940	19,347	826	666	673	2,890	373	7,965	32,740
Bars and heavy rods	1935	2,279	....	681	3,340	1,918	121	573	8,912
	1936	4,981	....	415	4,114	3,552	75	943	14,080
	1937	7,372	....	1,010	6,361	3,463	121	581	18,908
	1938	....	....	....	....	....	....	....	13,223
	1939	3,735	....	952	4,505	3,421	66	12,435	25,114
	1940	5,055	53	1,339	6,264	4,999	80	17,386	35,176
Strip (hot and cold rolled)	1935	5,504	....	736	1,312	1,504	316	1,175	10,547
	1936	9,550	....	488	3,886	2,538	118	148	16,728
	1937	8,611	....	236	6,211	5,100	73	352	20,643
	1938	....	....	....	....	....	....	....	15,928
	1939	25,769	....	1,381	479	11,761	17	1,910	41,317
	1940	34,476	363	1,863	1,847	20,612	87	3,832	63,080
Tubular goods	1935	592	....	114	312	252	328	210	1,808
	1936	621	....	108	609	360	40	86	1,824
	1937	1,016	....	34	407	394	383	1,518	3,752
	1938	....	....	....	....	....	....	....	2,087
	1939	1,282	....	34	22	102	363	842	2,645
	1940	3,969	....	40	280	96	207	2,204	6,796
Plates and shapes	1935	1,203	....	26	586	101	11	126	2,053
	1936	1,109	....	126	447	751	32	96	2,561
	1937	1,156	....	325	420	108	88	228	2,325
	1938	....	....	....	....	....	....	....	2,864
	1939	924	....	94	88	165	22	777	2,070
	1940	3,152	....	108	95	383	141	669	4,548
Wire and light rods	1935	1,982	....	102	368	301	4	473	3,230
	1936	713	....	201	1,616	885	86	230	3,731
	1937	1,241	....	205	908	880	114	514	3,862
	1938	....	....	....	....	....	....	....	3,522
	1939	2,157	....	55	1,429	4,827	50	231	8,749
	1940	5,762	39	220	1,526	4,977	79	1,892	14,495
Forgings	1935	553	....	122	773	576	20	226	2,270
	1936	1,889	....	482	792	71	69	338	3,641
	1937	735	....	115	862	778	128	223	2,841
	1938	....	....	....	....	....	....	....	1,799
	1939	297	....	1,931	2,239	33	41	301	4,842
	1940	1,098	174	2,208	1,825	105	85	303	5,798
Total (by analysis)	1935	18,599	....	2,193	8,171	7,905	856	3,156	40,880
	1936	28,075	....	2,763	14,985	11,665	574	2,110	60,172
	1937	32,783	....	3,571	18,453	15,285	1,120	4,639	75,851
	1938	....	....	....	....	....	....	....	56,833
	1939	47,326	....	4,552	9,384	22,014	581	23,612	107,469
	1940	72,859	1,455	6,444	12,510	34,062	1,052	34,251	162,633

GRAND TOTAL, all finished steels, all analyses—for 1935 = 40,880 net tons.
—for 1936 = 60,172 net tons.
—for 1937 = 75,851 net tons.
—for 1938 = 56,833 net tons.*
—for 1939 = 107,469 net tons.†
—for 1940 = 162,633 net tons.‡

*No separate breakdown available. Total figure for 1938 from American Iron and Steel Institute.
†Analysis groups are approximate; in several classifications each element may vary as much as ± 2 per cent from the range shown, or may include small percentages of other elements such as molybdenum.
‡From THE IRON AGE consumption survey, described in text. Exports included in "All Others" classification.



OVER the past few years stainless production has progressively hit new records. The 264,875-ton level for 1940 is big business, the value being about \$165,000,000. Present activity indicates a 1941 output approximating the dotted line, which is not a normal growth line but war-time flatulence. The small graphs below show changes in proportional popularity of various grades. Note particularly the increasing demands for strip, somewhat at the expense of sheets.



compared with past years in Table III. To do this requires a kind of dead reckoning technique, viz.: some of the figures collected by the American Iron and Steel Institute have shown in recent years an average conversion from ingot to finished steel of about 59 per cent, which, of course, takes care of hot-top crop, grinding losses, cut back during hot rolling, etc. However, investigation in a number of producing plants leads the writer to the conclusion that this average is a little too low.

The highest conversion is for bar, heavy rods, wire and wire rods, for which a pretty conservative estimate of major plant practice would indicate a figure of 68 per cent. For strip the conversion would be close to 60 per cent; and for sheets, plates and shapes the conversion should run on the average near 57 per cent. For tubular goods and forgings a guess would be, say, 60 per cent.

So, if each of these conversions is applied (in reverse) to the proper total finished steel figure shown in Table I, the ingot output for the year can be obtained. And, this ingot output compared with the finished steel total indicates an average over-all conversion on the order of 61.4 per cent. Using this 61.4 per cent conversion (again in reverse) on the totals by analysis shown in Table I permits the obtaining of calculated total ingots by analysis for inclusion in Table III. All this explanation may seem a trifle prolix, but the procedure is in essence a weighting of the various components to arrive at what is believed to be the most sensible calculated ingot tonnages.

Table III, therefore, indicates a calculated 1940 ingot output of all analyses of 264,875 net tons, which is a good 52 per cent above the previous record year of 1939.

In sending out the report blanks to the consumers, opportunity was again afforded them to register kicks or make suggestions to the producers. A compilation of these suggestions is shown on page 44 herein. There is little likelihood of producers being very concerned regarding these suggestions at the moment. For, pressure for deliveries is now so great that the fine points of merchandising have fallen by the wayside.

It is apparent from Table I that stainless in strip form occupies the dominant position, accounting for

over 38 per cent of total consumption.

It has been strip that for the past few years has forged far ahead in THE IRON AGE surveys. In the figures collected by the American Iron and Steel Institute no such dominance of strip is indicated, the figure being in the order of 13 per cent for 1940. Parenthetically, it might be mentioned that the Institute shows about twice as much sheet as does THE IRON AGE survey. In this day and age, it is most difficult to believe that there is some mysterious transmutation of sheet into strip in the journey from mill to consumer. Or, perhaps consumers and producers have different opinions as to what is sheet and what is strip, although the demarcation line is well established. The most likely explanation, however, is that large tonnages of sheet are slit into strip widths, both at the mill and in the consuming plants, and fractionation is not adequately reported by producers.

It would seem, therefore, that the consumers are doing a more realistic job of reporting than the producers, particularly in view of a check available in a third set of figures. The bi-annual census of Steel Works and Rolling Mill Industry, sponsored by the Department of Commerce, has for some months been available. And even though these census figures are somewhat shaky in certain directions, some interesting comparisons are possible. The census, which secures its data from producers, shows that for 1939 the volume of strip accounted for about 33.6 per cent of the total, and sheets were quite low, being on the order of 22.4 per cent of the total. These results approach the order of those shown by THE IRON AGE consumption surveys.

In strip, the 18 and 8 Cr-Ni and the 16-18 per cent straight-chromium analyses are by far most popular. The 18-8 grade of strip contains a number of modifications as, for instance, 18-8 columbium and 18-8 titanium, for use in numerous applications where welding operations are involved, and an 18-8 molybdenum type is growing more popular for special applications involving resistance to particular types of acids.

The 25-12 Cr-Ni analysis of strip showed considerable popularity, with a consumption of 1863 tons.

This steel being non-magnetic is used in certain sections of airplanes, and because of resistance to high temperature oxidation it finds extensive application in industrial furnaces, and is employed to great extent in pulp and paper equipment. The 12-14 per cent straight-chromium strip is also fairly important. This classification includes the 0.10 C, 12-14 Cr (410) classification; the 0.10 C, 12-14 Cr, 2 Ni (414); the 0.30 C, 12-14 Cr (420) classification; and other less popular variations. These steels are used for cutlery, springs, steel tapes, etc.

The 16 Cr-2 Ni analysis, first reported individually in 1940, shows a surprisingly high total, 363 tons. This grade is increasingly used in place of 18-8 for certain applications.

The second major outlet is in bar and heavy rods. Here again each major classification shown includes quite a number of variations and modifications, with some incidental titivation for merchandising purposes. The most popular analysis in bar form is 12-14 per cent straight-chromium, with 1940 consumption indicated as 6264 tons. The bulk of this group is probably the 0.10 C, 13 Cr grade, which is made up mostly of valve and turbine types, although some has sulphur or selenium (416) added to give free machinability. The 18-8 analysis of bar is second in popularity. This analysis group covers a number of variations including free-machining modifications.

It is the addition of free machining elements to stainless bar stock (and wire) that over the past few years has overcome consumer resistance and greatly expanded sales to a probable 8500-ton figure for 1940. Considerable work has been done in the past year to determine whether sulphur or selenium is the better additive element for free machining, but the results have been rather inconclusive. Perhaps selenium has a slight edge, but very slight indeed.

The large tonnage of bars shown in the "all other" classification is made up in great part by valve steels and special analyses for chemical work. In connection with aircraft engines, one popular valve steel is 13-15 Cr, 13-15 Ni, 1.75 to 3.0 W, 0.50 Mo, 0.40 to 0.50 C and 0.30 to 0.80 Si. And, of course, there are included large tonnages of

Buyers of Stainless Alloys Want

(1) Lower Prices: As usual many consumers (500 or so) expressed a desire for lower prices. The complaints seem to be much less passionate than in past years, however. Most of the lower-price sentiment seems rooted in the plants making food handling equipment, kitchen utensils, etc.

(2) Improve free cutting properties.

(3) More reliable corrosion data for organic chemicals. Present data far too optimistic. Deep pits found in milk pasteurizers.

(4) Better warehouse stocks. More stock sizes in 27 per cent Cr analysis.

(5) More uniform control of temper when steel is to be deep drawn.

(6) Warehouses do not carry any worthwhile sheet stock in straight-chrome grades.

(7) Should be specific tables recommending certain types of stainless for various chemical combinations under varying temperatures.

(8) A welded tube highly polished inside or out, No. 180 grit or better.

(9) Standardize on a few types instead of making so many just because another mill makes a "special" for a customer.

(10) It is very regrettable that some producers sell obsolete or rejected stock to so-called "wild-cat dealers". This is detrimental to the stainless industry, as the steel is so often misrepresented to users not definitely familiar with this material. The result is that considerable trouble is encountered and the manufacturer ultimately shoulders the responsibility. There has been considerable quantities of this stuff let out on the market over the past year.

(11) Dull finish on full-hard sheets for the absorption of light.

(12) More warehouse stocks of Types 347, 316, 317.

(13) Have Army and Navy conform to Institute or S.A.E. numbers.

(14) Hard drawn tubing in sizes 1 in. to 3 in. not readily available.

(15) More uniformity in cutting qualities.

(16) Square root bar angles.

(17) Carry hot rolled bars and do finishing operations as ordered.

(18) Produce Type 440 stainless electrodes for welding to steel base metals.

(19) Improve methods to eliminate scratching when metal is being formed.

(20) Impart non-galling and non-seizing properties when steels are to be used against each other.

(21) Continued improvement in finish.

the popular chromium-silicon valve steels of the 8-3 type, and modifications thereof. The increasingly popular 16-2 Cr-Ni combination is shown separately for this first time in 1940—the total, 53 tons, is probably only a fraction of what will be reported in 1941.

Sheets, the third largest outlet, show a 1940 consumption of 32,740 tons. The 18-8 classification is by far the largest, which includes the ordinary 18-8 (304) and many different variations and modifications. These sheets are used to a large extent for collector rings and fire resistant parts in aircraft, by food handling equipment makers,

in architectural work, in the milk industry, etc. The 16-18 per cent chromium grade is next in popularity, with consumption indicated as 2890 tons. This grade, and various modifications, is used where not as great corrosion resistance as the 18-8 variety is needed, and to some extent in certain chemical installations, etc. The 16 Cr-2 Ni classification, showing a consumption of 826 tons, is surprisingly high, and indicates an acceptance of this analysis hitherto unsuspected.

Note from Table I that consumption of wire is quite high, being indicated as 14,495. The rise in wire consumption has been steady

over the past few years. Considerable quantities of 16-18 Cr wire go into screw machine products, large quantities of 18-8 wire go into applications varying from soft weaving wires to very hard spring wires. Considerable tonnage in the 12-14 Cr class goes into spokes in automobile steering wheels. The Naval and shipbuilding program have both used a large volume of stainless wire, as has also the burgeoning aircraft industry. A large portion of this wire is used in the form of welding rod, which these days is very definitely a tonnage proposition. For instance, in March, 1941, the Navy purchased 2,000,000 lb. of 25-20 welding rod (wire) for armor plate.

The 1940 survey showed a consumption of 6796 tons of stainless tubing. Much of this went into furniture, into the chemical industries, into marine and aircraft work, etc. A large quantity of this tubing is welded, mostly by the atomic hydrogen arc process, although quantities of hot pierced and cold drawn seamless tubing is sold. The largest percentage of the tubing sold was in the 18-8 classification, which includes variations and modifications for a variety of special corrosion problems.

Stainless Steel Castings

The consumption of stainless steel (also abrasion and heat resisting) castings in 1940 was on the order of 11,823 tons, a new high record for castings, 23 per cent above the previous record year of 1939. These figures are based on returns from an estimated 86 per cent of the consumers and adjusted to 100 per cent consumption.

It is indicated in Table III that the 18-8 analysis of stainless casting is still retaining a fair degree of popularity. This is considered a rather standard composition, and for certain applications involving considerable corrosion about 3 per cent molybdenum is often added. One fairly new application is for manifolds for heavy duty automobile engines.

A greater quantity of tonnage is bulked in the "all other" classification for castings than in rolled steel. This comes from the many special and high alloy analyses being cast today. The 29-9 Cr-Ni analysis is a good example. Sometimes 1 per cent molybdenum is added to this 29-9 class and it is possible to run carbons consider-

ably higher than in the 18-8 analysis. Machinability of 29-9 is considerably better than 18-8, and the former is used a great deal in paper mill work and for heat resisting applications. The 29-9 composition has excellent resistance to intergranular corrosion, and very good strength and ductility. A major analysis in the "all other" group is 15-35 Cr-Ni, which is a popular steel for high temperature work, where neither scaling nor distortion is permissible. The second most prominent heat resisting steel in the "all other" group is the 60 Ni-12 Cr type, which accounted for about 890 tons in 1940. Another analysis is 15 Cr, 14 Ni, 1 C, and 3 Si, a rather new and unusual type, which is finding considerable application in valve stems.

At the present time about 85 per cent of the casting's production falls in the "defense" category. Foundries are frequently not able or are disinclined to consider non-defense business, particularly in view of the difficulty in securing adequate raw materials.

Export Volume Increases

As regards export of stainless steel, only the past few years have been of any moment; in fact, prior to 1935 frequently more stainless was imported than exported. Foreign deliveries got a really noticeable lift in 1939, and in 1940 exports were quite sizable both in quantity (5737 tons) and in value (about \$3,500,000). What the record will be in 1941 is difficult to estimate, but it is doubtless true that an additional spurt, twofold or more, will be recorded. The record in exports (mainly to the U.S.S.R., occasionally to Japan) of finished rolled stainless steel for the past two years, shown in net tons, is as follows:

	1939	1940
Sheets	1225	1989
Bars	332	1863
Strip	980	970
Plates	172	668
Forgings	124	186
Castings	34	61
	<hr/> 2867	<hr/> 5737

Geographical Distribution

Certainly, one of several distinct advantages in going to 4960 consumers of stainless steel for their consumption data is that practically every pound of alloy is accounted for geographically. This is of extreme importance, particularly from the marketing viewpoint and

can be the ruling factor in the locating of future plants. Hitherto no such data have been available for any type of steel, let alone for closely controlled alloys as stainless.

Last year a very rough geographical breakdown was made, although no mention of the results were reported at the time. The country was divided into two parts by a north-south line running through Columbus, Ohio. It was ascertained that for 1939, very close to 45.2 per cent of stainless consumption fell to the east of such a line, 52.1 per cent west of the line, and 2.7 per cent was exported.

In the 1940 survey, described herein, the country was arbitrarily split into four sections, as shown in the illustration on page 47. Stainless steel consumed in each of these four sections is shown in the same illustration, both as to tonnage and percentage of the total. It may be seen that the Central States and the Northeastern States vie for dominance, accounting respectively for 47.4 and 41.6 per cent of the total. The South and

Southwest consumed only 1.6 per cent, the Far West fabricated 5.9 per cent, and 3.5 per cent went to foreign users.

In all probability a product breakdown as regards geographical distribution will be attempted next year. At this time only certain generalities can be made—the bulk of the consumption in the Northeastern States is made up of bars and wire, whereas strip and sheets dominate consumption in the Central States. Types used in the remaining districts are fairly well balanced.

Application Distribution

As in last year's consumer survey, the 1940 blank included a request for a distribution of steel as to final outlet, i.e., the automotive, food processing, chemical, industrial equipment, etc., fields. The bulk of consumers carefully answered this question, but still many had difficulty with their records in correctly apportioning purchases as to final application. Some, of course, had no idea as to what the

AUTOMOTIVE:

(Includes gas and Diesel engines, buses, tractors, trucks and trailers.)

1939 = 37.8 per cent
1940 = 35.3 per cent

FOOD HANDLING:

(Includes restaurant equipment, dish washers, meat, beer, milk and yeast handling machinery and equipment, soda fountain equipment, army food kitchens, professional cutlery.)

1939 = 11.4 per cent
1940 = 15.9 per cent

TRANSPORTATION:

(Other than automobiles: includes trains, boats, aircraft; aircraft engines, radios, spark plugs, oxygen cylinders, naval vessels.)

1939 = 11.3 per cent
1940 = 21.5 per cent

CHEMICAL EQUIPMENT:

(Includes soap, pulp, paper and petroleum equipment, rayon machinery, etc.)

1939 = 6.3 per cent
1940 = 7.4 per cent

MACHINERY:

(Includes machine tools, pumps, turbines, textile machinery, coal screens, electrical springs, industrial instruments, valves, ball bearings, conveyor belting, glass mold equipment, weighing machinery, furnaces, boilers, etc.)

1939 = 5.7 per cent
1940 = 5.8 per cent

HOUSEHOLD EQUIPMENT:

(Includes stoves, furniture, beds, pots and pans, cutlery, washing machines, refrigerators, vacuum cleaners, sinks, kitchen trim, etc.)

1939 = 3.5 per cent
1940 = 3.9 per cent

BUILDING CONSTRUCTION:

(Includes building decoration, signs, fans, blower equipment, plant maintenance, electrical equipment, oil burners and other heating equipment, etc.)

1939 = 1.6 per cent
1940 = 1.8 per cent

ALL OTHER:

(Includes small arms, surgical supplies, fishing lures, wire cloth and screens, watch cases, spraying wire, etc.; and all other non-allocated steel.)

1939 = 25.1 per cent
1940 = 8.4 per cent

final usage was. None the less, more than enough data were available so that with proper adjustment a distribution as to consuming groups was available for 1940. This complete breakdown tallied up as follows—note particularly, however, that considerable care should be exercised in comparing the percentage figures for 1939 and 1940 in view of the considerable difference in the undistributed tonnages in the "all other" classification for the two years.

This distribution of stainless as to final outlet shows that in 1940 the automobile industry again was the single best customer, accounting for 35.3 per cent of the total. This is a slight drop from the previous year, even though automobile assemblies were heavier in 1940. The drop can be credited to a stock carryover at the first of the year, and in some instances to the use of more plated die castings and chrome plate in general on certain '40 models (they were pretty gaudy looking in general), the same being true for buses, tractors and trucks. In the '41 models there was a generous increase in the amount of stainless steel strip for trim, decorative effects, louvres and other body accoutrements. Belt moldings on many of the '41 cars are about twice as wide as in '40, and on certain cars this stainless is given a flash chrome plate to insure perfect match with other chrome plated trim used on the car. For such application the stainless is far harder, more corrosion and abrasion resistant than brass or mild steel strip, and the flash chrome plate has no function other than to assure color matching. It is doubtful, however, whether this increased use of stainless in '41 cars will show up much in next year's stainless survey, as assemblies will be driven progressively downward over the remainder of the year through imposition of government priorities.

Whereas the second major outlet for stainless in 1939 was in food processing and handling equipment, this second place was usurped in 1940 by the transportation industry (other than automobiles). Just about 21.5 per cent of 1940 stainless went into transportation, the great increase over the previous year being accounted for by the rapidly stepped up naval program late in 1940, a sharp spurt in aircraft assemblies and slightly in-

creasing use of stainless in aircraft, continued production of streamlined trains, etc. The use of stainless in naval craft and in streamlined trains is an accepted fact and quite secure against displacement. The adaptation of stainless in aircraft construction, however, continues to be quite sluggish. It is well recognized that established aircraft makers are experienced mentally and physically for the handling of aluminum. Also, until very recently stainless makers have been so intent on competitive struggles that the common front in the aircraft field has been pretty ragged. Within the past year, however, tests made at the Bureau of Standards have afforded designers some hitherto unknown data; and test wings of quite large size welded by the Budd company have performed extremely creditably. In metallurgy also, certain recent experiments are particularly encouraging, and a summation of these data is given later herein, in the section devoted to technical developments. Irrespective of all these advances, however, stainless steel will probably not assume its rightful place in aircraft construction until those companies fully familiar with the fabrication of stainless get into the aircraft industry, along with engineers willing and capable of designing so as to obtain the full benefits of stainless construction.

The third major outlet for stainless in 1940 was for food handling and processing equipment, which accounted for 15.9 per cent of the total, as against 11.4 per cent in 1939. This improvement is primarily a continuation of a trend noticeable over the past few years, and an additional fillip was given by the fabrication of considerable quantities of equipment for army food kitchens and food handling units for other services. In the field of food handling and processing there are far more individual consumers of stainless than in any other field, although of course the amount taken by each consumer is relatively small. In food handling, also, the application of stainless progresses because of its ideal characteristics for such service and despite the relatively higher cost of stainless. None the less most of the criticisms of the high price of stainless comes from this group. During the year, the use of composite steels, particularly the new material Pluramelt, showed rapid

strides in the food handling field. One large fabricator is now using this type of steel almost exclusively, finding that fabrication is easier, the price is lower than solid stainless, and the heat transferring properties is considerably superior to that of solid stainless.

The amount of stainless going into other consuming groups showed no particular change in 1940. Household equipment accounted for 3.9 per cent of the total, chemical equipment took 7.4 per cent, machinery 5.8 per cent, and building construction took 1.8 per cent. These are all slight advances over the previous year, although the increase can probably be ascribed merely to the general improvement in industrial activity.

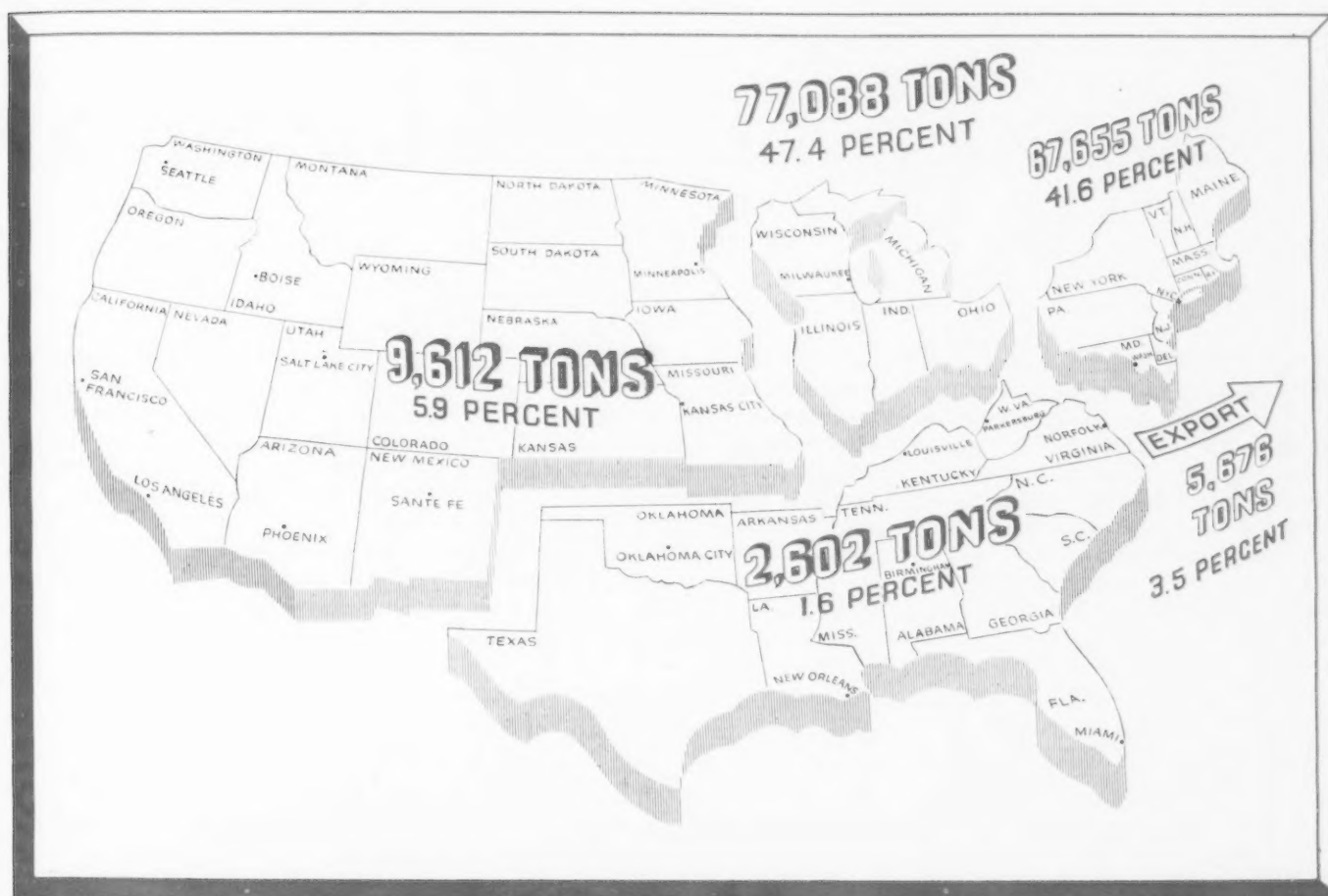
Considerably more steel was allocated to specific fields of application in the 1940 survey, as against the survey of the previous year. Of the 8.4 per cent in the "all other" group in 1940, a sizable proportion went into direct armament production, as for instance a rather large piece of stainless on each Garand rifle, use of stainless in other small arms, use of 0.35 C 12 Cr. alloy, hardened to 300 Brinell for the elevating mechanism of trench mortars, etc., etc.

Technical Developments Lag

All stainless producers are now being shoved hard by demands of the defense effort. The result has been a disinclination to spend time and plant facilities on new developments, and the few brainchild that have matured are being salted away in company safes for exploitation after the emergency. However, in 1940 there were a few shifts in practice worthy of detailed attention.

The tightness in the nickel supply has forced a number of American producers to consider the merits and demerits of Type 431 steel, containing 16 per cent chromium and 2 per cent nickel. For years this alloy had been popular in England and on the Continent, and corrosion resistance equal to the popular 18 and 8 analysis was claimed.

Type 431 is a very tricky alloy to make, requiring particularly careful heat treatment. In fact, one serious airplane accident several years ago was credited to careless heat treatment of this type of steel. Within the past year, however, certain American mills have



THE 1940 survey dispenses the mist of uncertainty as to where stainless passed into the hands of the ultimate fabricator. Note that the Central and the Northeastern States account for the bulk of consumption—the South, Southwest and Far West are as yet of no great importance.

perfected production technique, and quite sizable tonnages are now being turned out. Believing that this grade will be increasingly used over the next few years, it has been added as a specific analysis to the production survey. In 1940, it may be noticed that approximately 1455 tons were consumed.

The scarcity of nickel has encouraged American makers to also consider other modifications of the Cr-Ni and straight-Cr analyses, particularly those modifications that have for some years experienced considerable popularity in Germany.

Of growing importance are analyses containing manganese. Of course American producers have for some years added 1 to 2 per cent manganese to the more tender standard stainless grades, as for instance the molybdenum-bearing 18 and 8 alloy and the high chromium-nickel steels. Such manganese additions greatly improve hot ductility and aids in the initial breakdown and hot working of the ingot.

These small additions have had no detrimental effect on corrosion resistance and other properties.

In Germany, however, nickel is thrown out entirely and large quantities of manganese are used, anywhere from 8 to 18 per cent (which was originally developed in the U. S.). As has been pointed out at various times in this yearly review, such German grades have a soft coloring not unlike that of silver, and for that reason have been used abroad for tableware. The German grade containing 8 to 10 per cent chromium and 16 to 18 per cent manganese is most popular for table and hotel cutlery, and the 16 to 18 per cent chromium and 8 to 10 per cent manganese grade is used for milk cans, pump filter tubes, pasteurizing equipment, cooling apparatus, etc. A number of American producers are now turning out experimental heats of these two analyses and variations thereof, and results to date have been sufficiently encouraging to guarantee increasing production over the coming years.

Not to be outdone by the Germans, some technicians in the U.S.S.R. have reported on the development of new types of heat resisting steels containing no nickel. It has frequently been pointed out by observers in the United States that silicon is the equivalent of seven times the chromium, and aluminum more than five times the chromium in the production of heat resisting surfaces. According to experiments in the Stalingrad Tractor Plant, there is a positive action of copper with chromium and manganese in the sense of making a heat resisting steel. From the extensive tests already carried out it is concluded that chromium-silicon steels with the addition of 2 per cent aluminum and about the same amount of either molybdenum or copper (steels of the general type 0.53 C, 0.63 Mn, 2.42 Si, 8.51 Cr, 2.0 Al, 1.52 Mo; or 0.21 C, 0.57 Mn, 2.49 Si, 18.87 Cr, 2.34 Cu, 2.41 Al) may be selected for services requiring extremely high heat resistance. These steels are also rea-

(CONTINUED ON PAGE 117)

Design Possibilities for Square W

DESPITE the fact that square welded tubing has been commercially available for a number of years, there is a considerable number of designers and production men who are not acquainted with the possibilities of this structural material and its relative advantages, both from the engineering and the economic point of view. Early this year, for example, a manufacturer was asked to bid on an assembly which was to contain a square wood stringer enclosed in a thin sheet steel cover. The specification called for this member to be made by forming a channel from strip stock, inserting the wood core, then welding on a strip to form the fourth side of the square. It proved to be an entirely impracticable method of construction. A wholly satisfactory solution was found in using square welded steel tubing into which the wood center was pressed.

Further indication of the general unawareness of the square tube's possibilities is found in a re-

cent remark made by a welding engineer, who "gets around" on a large scale, to the effect that square steel tube, if available at low enough cost, would make possible many improvements in design of steel structures. It actually is available at a cost that is consistent with the advantages which it offers in the fabrication of numerous articles, for both industrial use and consumer use.

Square and rectangular welded steel tube is a standardized and highly perfected material. That it is commonly overlooked by designers is probably because the word tube suggests a round shape, which for various reasons they do not want to use. And further, their search for straight sided shapes generally extends only to the convenient angles, channels, etc., on the assumption that a square or rectangular tube would be prohibitive in cost. While it is true that costs are high for small lots and special sizes, when there is enough volume

to absorb the preparatory cost, the story is different. In the applications to be described there is a noticeable concentration on one or two sizes in each assembly, which results in economies all along the line.

As to availability, practically all of the producers of round welded tubing can furnish square tube, as well as numerous other special shapes. The standard sizes of the square shape are listed in Table I. There are two common ways to make the square section. In both cases the first step is to produce a round tube. Flat rolled steel strip of the proper width and thickness is fed from coils through forming rolls, which gradually shape it to a true circular section. As the edges come together they are welded, usually by electric resistance welding. The process is continuous, and customarily suitable lengths for handling and shipping are cut as the tube comes from the welding rolls.

Dies or rolls for shaping to a

FIG. 1—Square tubing offers a flat surface for attachment of sheet metal by several methods. Top row: Bolting or riveting, and spot or projection welding. Bottom row: Drive or self-tapping screw, and Huck rivet.

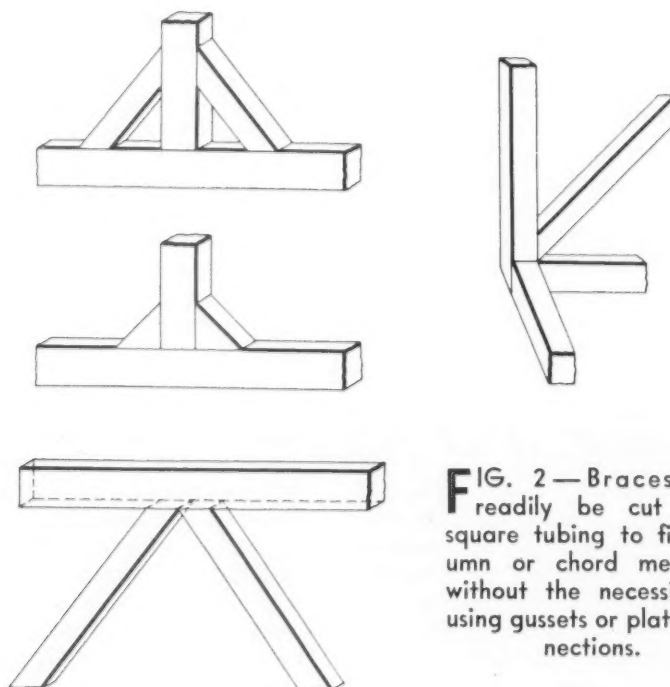
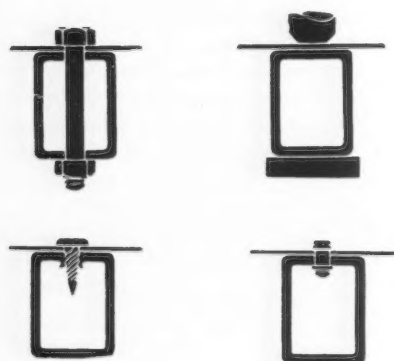


FIG. 2—Braces can readily be cut from square tubing to fit column or chord members without the necessity of using gussets or plate connections.

e Welded Tubing . . .

By H. S. CARD

square or other special section may be set up to receive the round tube as it emerges from the welding rolls. This integrated production of the special shape is obviously the most economical, provided that the quantities ordered of a single size are large. In the metal bed indus-

try where large quantities of one shape are used, the square tube can be produced at the same cost as round tube. When volume does not justify the set-up expenses of roll forming, shaping can be done on a draw bench, using round tube from stock. It is apparent therefore that a fussy design that uses two or more sizes where a single size might serve turns out to be a luxury in more ways than one.

Since both round and square tubes are formed from rolled strip, it follows that the wall thickness is inherently uniform within the standard tolerances of the strip (0.004 to 0.006 in.). Square tube size tolerances are from 0.004 to 0.007 in. up to the 2-in. square size. The finished tube has the same surface finish and uniform temper as the strip material. Physical proper-

ties of standard analyses are given in Table II. The figures are average minimum, but there is a slight difference between the lighter and heavier gages, the light gages running higher in tensile strength and the heavier lower than those given in the table.

Table III has been prepared to show the relative design economy of the square tube section, compared to the angle section and the round tube section. For this purpose three commonly used sizes of square welded steel tube have been selected and each of these is compared with three angle sections and two round tube sections. This table makes it possible to compare the load capacity of sections having the same area and of sections occupying approximately the same amount of overall space, and also to compare the weights of sections having approximately the same load capacity. These comparisons are necessarily



ABOVE

FIG. 4—Chair legs utilize a tubing section that has a round outside corner. This is an example where quantity production permits departure from standard shapes of tubing.

Table I—Standard Sizes of Square Welded Steel Tube

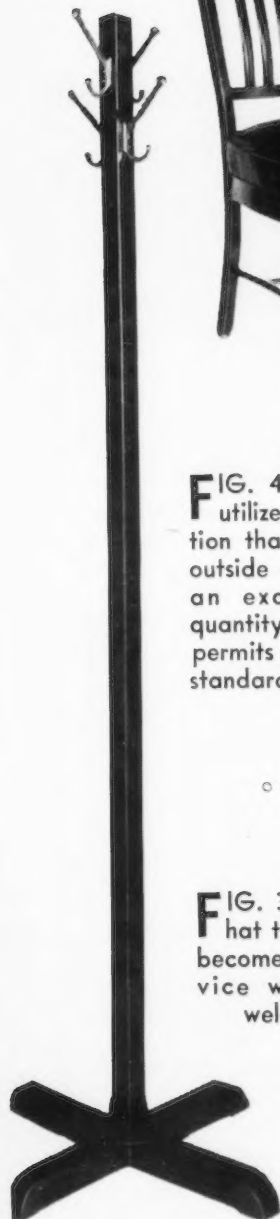
Side of Square In.	Size Increments In.	Wall Thickness In.
$\frac{3}{8}$		.028 to .065
$\frac{1}{2}$ to $\frac{3}{4}$	$\frac{1}{8}$	.028 to .083
$\frac{7}{8}$ to $1\frac{1}{8}$	$\frac{1}{8}$	.028 to .095
$1\frac{1}{4}$ to $1\frac{3}{4}$	$\frac{1}{8}$	.035 to .109
2		.035 to .120
$2\frac{1}{2}$		.049 to .148
3 and 4		.065 to .148

Table II—Physical Properties of Welded Steel Tubing

Type of Steel SAE	Temper	Yield Pt. Lb. Per Sq. In.	Ultimate Lb. Per Sq. In.	Per Cent Elongation in 2 In.	Rockwell B Scale	Brinell 500 Kg.
1010	Hard	55,000	60,000	10.0	75	120
	Medium	45,000	55,000	25.0	60	85
	Soft	30,000	45,000	45.0	50	65
1015	Hard	60,000	65,000	8.0	80	125
	Medium	45,000	55,000	20.0	65	90
	Soft	35,000	50,000	40.0	55	70
1020	Hard	60,000	65,000	7.5	80	130
	Medium	45,000	60,000	18.0	70	100
	Soft	35,000	55,000	35.0	60	80
1025	Hard	65,000	70,000	7.0	85	130
	Medium	50,000	60,000	18.0	75	105
	Soft	40,000	55,000	35.0	65	85
1035	Hard	75,000	80,000	5.0	85	150
	Medium	50,000	65,000	15.0	75	110
	Soft	40,000	60,000	30.0	65	90

LEFT

FIG. 3—The familiar hat tree or costumer becomes a sturdy device when built of welded tubing.



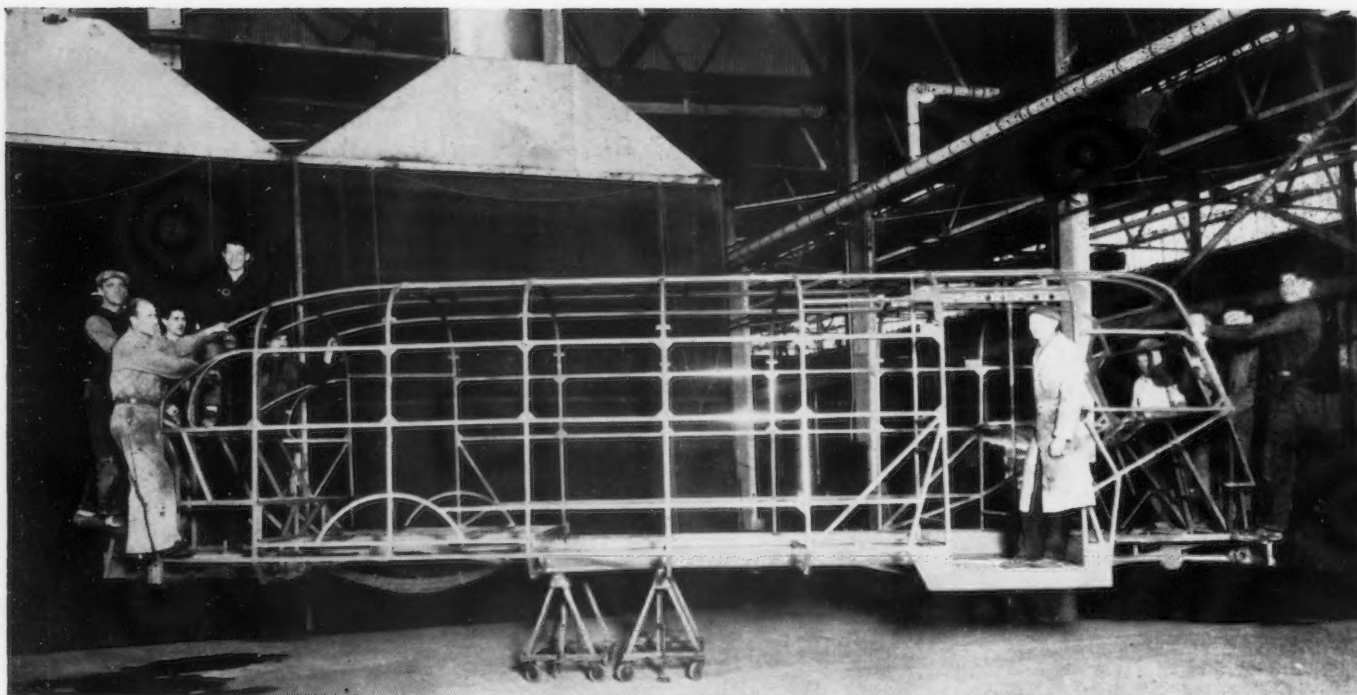


FIG. 5—Lightness and strength are found in this coach frame fabricated of square tubing. Early designs used round aircraft tubing, the switch being made to square tubing to facilitate attachment of body panels.



ABOVE

FIG. 7—Template table for an oxy-acetylene cutting machine. Except for the solid square guide bar, square tubing is used throughout.

○ ○ ○

RIGHT

FIG. 8—Square tubing fits into this unusual design of a carriage beam for gas cutting torches. The upright reinforcing pieces are channel sections.

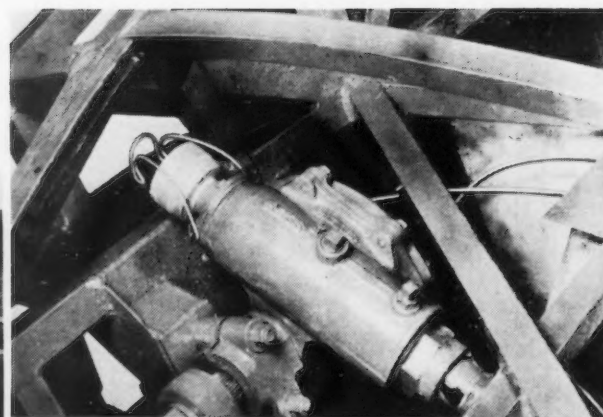
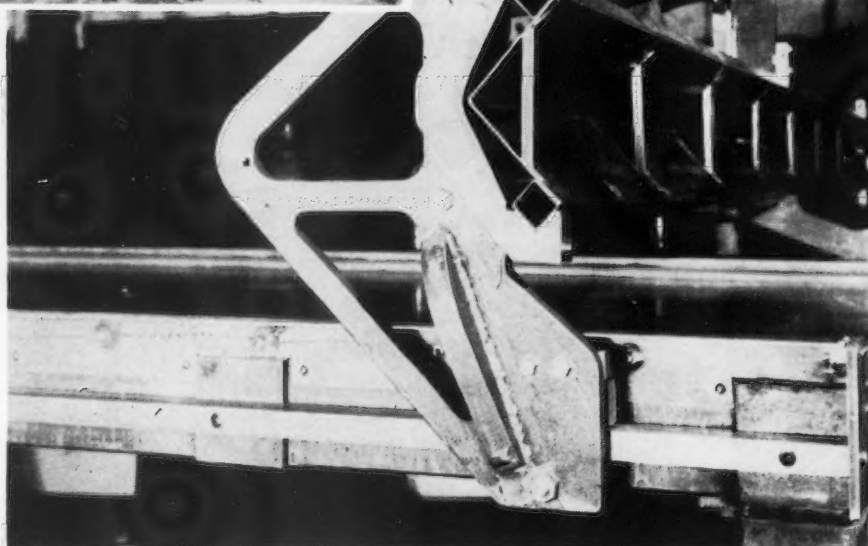


FIG. 6—Detail of the front end of the coach frame shown in Fig. 5.

only approximate because standard sizes of the various sections do not have the same characteristics. Also, there will be several angle sections having an area which approaches the area of the square tube selected. To make a fair comparison therefore, one must select out of a group the angle sizes which can carry the greatest load, which will in general be the one with the longest legs and the least thickness. If a comparison is made by selecting an angle which will carry the same load and computing the ratio of the areas, there will again be several such angles, and it is necessary to select the most economical one.

When figuring compression loads, for the same section area, the thinner the wall the more economical the section. Hence, if we use the same thickness of wall in one section and a different thickness in another, the two sections may not be properly comparable. Table III therefore has been made up of those values which are considered reasonably comparable and it shows with reasonable accuracy how the various sections compare in economy of material. As would be expected from a purely mathematical analysis, the round tube shows the most favorable distribution of material, although in the sizes selected the advantage of the round over

the square shape is not very large, whereas the superiority of the square over the angle section is on the whole quite significant. For example, the 1 x 1 x 1/8 in. angle, weighing more than 50 per cent more, is about 30 per cent lower in efficiency than the 1 1/8 x 1 1/8 x 0.035 in. square tube, and the 1 x 1 x 3/16 in. angle, which has not quite the load capacity of the 1 1/5 x 1 1/8 x 0.035 in. square tube, weighs over twice as much.

Although square tube is on the whole slightly higher in cost than round, and has a somewhat lower strength-weight ratio, there are compensating advantages in greater ease of fabrication for some applications. The square section can be sawed about as readily as lumber. It can be bent in one direction within reasonable limits. It offers a flat surface for low cost joining to sheet metal by several methods, as shown schematically in Fig. 1. The slightly rounded outside corners provide a natural welding groove for gas or arc welding. Braces can be cut from it to fit column and chord members without using gussets or other plate connections. Simplicity of preparation needed for typical joint designs is illustrated in Fig. 2.

The range of possibilities for using square tubing is best indi-

cated by examples of recent designs in different fields of application. Extremely simple is the Harter costumer, Fig. 3, a welded, one-piece jointless product. Its lifetime rigidity contrasts very favorably with decrepit wood costumers wobbling uncertainly in thousands of private offices.

Tubing used in the construction of Harter office furniture is not all fully squared. Chair legs utilize a section which has a round outside corner. This gives a pleasing appearance, while the flat sides of this section offer the best possible base for welding on the square or rectangular bracing members, Fig. 4. A similar section is used to frame a table or bench top where a round edge is desired.

Lightness and ease of fabrication are characteristics of the General American Aerocoach Company's motor coach frame, Fig. 5. The low weight of this frame permits a reduction in the size of the prime mover, of numerous working parts and of wheels and tires. Economies are thus realized in both first cost and maintenance. In operation there are impressive savings in gasoline consumption and tire wear. Important fabrication details illustrated in Fig. 6 show how square tubing lends itself to welding complex joints. Simplicity of assembly

Table III—Allowable Column Loads for Various Structural Sections
Column Length 3 Ft.

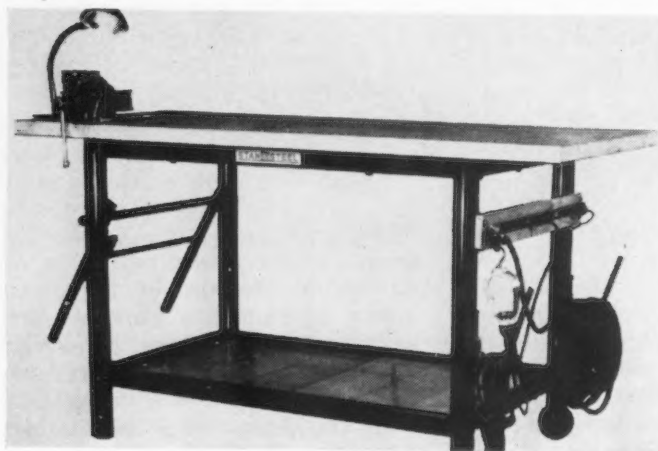
Section	Area Sq. In.	Weight Lb.-Ft.	Radius of Gyration r, In.	Allowable Column Load, Lb.
1 1/8 x 1 1/8 x 0.035 in. square tube	.153	.519	.445	2110*
1 x 1 x 1/8 in. angle	.23	.80	.20	1480**
1 1/4 x 1 1/4 x 1/8 in. angle	.30	1.01	.25	2510**
1 x 1 x 3/16 in. angle	.34	1.16	.19	2040**
1 3/8 x 0.035 in. round tube	.147	.500	.474	2090*
1 1/8 x 0.042 in. round tube	.143	.486	.383	1820*
1 1/4 x 1 1/4 x 0.120 in. square tube	.542	1.84	.464	7670*
2 x 2 x 1/8 in. angle	.48	1.65	.40	6270**
1 3/4 x 1 3/4 x 3/16 in. angle	.62	2.12	.34	7170*
1 1/4 x 1 1/4 x 5/16 in. angle	.68	2.33	.24	5440**
1 1/2 x .120 in. round tube	.520	1.77	.490	7480*
1 1/4 x .120 in. round tube	.426	1.45	.402	5590*
1 1/2 x 1 1/2 x .065 in. square tube	.373	1.27	.586	5650*
1 1/2 x 1 1/2 x 1/8 in. angle	.36	1.23	.30	3610*
1 1/2 x 1 1/2 x 3/16 in. angle	.53	1.80	.29	5140**
2 x 2 x 1/8 in. angle	.48	1.65	.40	6270*
1 7/8 x .065 in. round tube	.370	1.26	.640	5700*
1 1/2 x .083 in. round tube	.370	1.26	.502	5360*

* Where value of L/r is less than 120, the formula for allowable unit stress S is $S = 17,000 - \frac{.485 L^2}{r^2}$

** Where the slenderness ratio L/r is greater than 120,

$$S = \frac{18,000}{1 + \frac{L^2}{18,000 r^2}}$$

jigs, use of round tube members where special bends are required, simplicity of cutting bracing members from square tube, readiness of joining square tubes in cluster at an intersection, and the fact that the frame offers plane surfaces for attachment of sheet metal covering are some of the advantages of this construction. Experience has demonstrated that this type of frame acts to localize shock in case of collision and thereby provides maximum safety combined with light weight.



An entirely different set of conditions are found in the applications of square tubing in the design of the automatic flame cutting machine made by the National Cylinder Gas Co. Several entirely different structural units are involved. First there is a table, Fig. 7, which holds the template over which a guide wheel must travel when cutting shapes. The frame of this table is fabricated entirely from 4 in. and 2 in. square tubes. Then, there are two types of structures in the cutting torch carriage. The carriage beam itself is made by welding two 1 1/4 in. square tubes to a formed angle of 1/8 in. steel plate, Fig. 8. The stiffeners of 3/4

in. channel are spaced equally throughout the length of the beam. The third member, not shown, is the carriage truss which is triangular in shape and triangular in section. The square tube makes for ease in fabrication of such a truss because all cuts can be made with a saw. The entire design is simple and these various structures are not difficult to fabricate. The design has resulted in a high degree of rigidity which is particularly important in this machine because of the necessity for a very precise

frame of the table top is also rectangular tube. In both locations, the 2 x 1 3/16 in. x 16 gage size is used. The legs of the table are 2 in. round tube of 16 gage. A feature of this design is that there is no special preparation necessary to secure a satisfactory joint between the rectangular and the round tubes. The rectangular tube is sawed and when it is placed against the round, it is a very easy matter for an arc welder to build up the joint. Compared with the necessity for punching or milling contour joints when fabricating round tube assemblies, this design has an attractive simplicity about it.

Just as in the use of any new material in design, the square tube needs a little study. In particular, the tube manufacturer should be consulted in the selection of sizes, because it is impracticable to carry the full range of standard sizes continuously in stock. The supplier's recommendations are likewise valuable on such fabricating details as cutting, welding, reinforcing for bolt holes and bending, when bending is necessary. It should be borne in mind also that the thin walls are surprisingly strong, and that the tendency as a rule is to underestimate the load carrying capacity of the light square sections.

In view of the growing necessity for conserving materials, the advantageous properties of the closed section, as illustrated in Table III, seem to merit serious study by the designer. Further weight savings than those indicated in the table might frequently be possible by increasing the allowable unit stress where the joint design is such that eccentric loadings are practically eliminated. It is not difficult to design such joints when sizes are not unduly mixed in the same structure, and the fabrication problem itself is extremely simple.

FIG. 9 — Rectangular section tubing for horizontal frame members are combined with round tube legs in this modern workbench.

correlation of the torch and tracer wheel movements.

Very similar to the square tube in fabricating properties is the rectangular welded tube. This works to advantage in cases where there is a large bending load mostly in one direction. Rectangular tube is made in sizes from 3/8 x 3/4 in. to 2 1/2 x 4 in. and in thicknesses from 14 to 22 gage. Fig. 9 shows the use of rectangular tubing in the construction of a portable work bench. Here rectangular tubes are used at the bottom to act as bracing members and as support for a shelf. Small angles are spot welded to the inside wall to hold the shelving. The

New Rust-Proof Finish for Metal Parts

A NEW black, rust-proof finish on copper by anodic oxidations has been announced under the trade name, Electro-Jetal process, by Alrose Chemical Co., Providence, R. I., originators of the Jetal process for blackening iron and steel. The company states that any metal that can be copper plated can be blackened by Electro-Jetalizing.

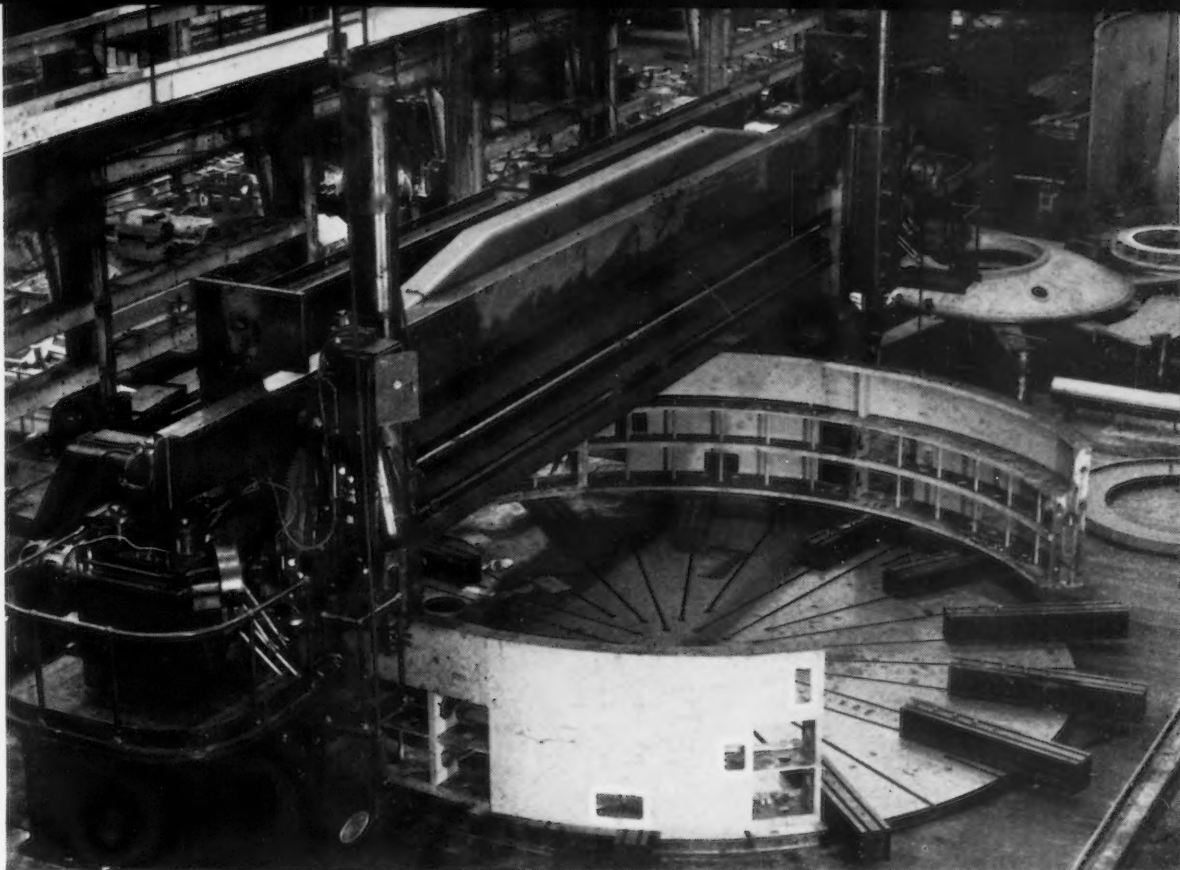
After preplating with copper, products being treated are immersed in a special electrolytic oxidizing bath for 2 to 5 min. The resulting velvety black surface is an excellent absorptive base for an after-treatment of oil, wax or lacquer.

The bath can be operated at any temperature below the boiling point of water, using ordinary steel con-

tainers heated by steam coils. Work can be oxidized on racks, in bulk or in baskets. The chemical cost, exclusive of the copper plate, is said to be about 25c. per 1000 sq. ft. of surface. The process has been applied industrially, and it is claimed that one firm is using the process on more than 260,000 small parts per day.

288-Ton Capacity Boring Mill

First job done on the mill was the machining of a four segment steel fabricated stator for a 35,000-kw. generator. The stator to be machined for a 33-ft. bore is shown being assembled on the machine.



ONE of the world's largest adjustable-housing boring mills, capable of handling work pieces up to 40 ft. in diameter for normal operation and up to 52 ft. in diameter by eliminating the cross-rail and re-locating the mill housings, is now at work machining large water wheel stator frames at the East Pittsburgh works of the Westinghouse Electric & Mfg. Co. Besides its claim of bigness, this new boring mill incorporates the most advanced features of modern machine tool design and makes increased production speed on large steel structures possible by eliminating many of the special machining set-ups formerly necessary on the smaller mills in the shop.

Rating the capacity of a mill of this unusual kind requires some explanation. The table proper is 30 ft. in diameter and by using outriggers extending from and located by the radial T-slots it is possible to rotate work up to 40 ft. in diameter. If desired, the whole housing and rail assembly can be lifted back out of the way so that a work assembly 56 ft. in diameter can be bored internally by mounting a tool head auxiliary on the revolving work table. A similar type of head can be mounted on the floor plate and used to turn work larger than 40 ft. supported on the table outriggers.

A unique feature of the mill is the construction of the rail housings. The conventional mill has a

cross rail that is elevated on fixed housings. On this machine, the cross rail rests upon raising blocks which are made up into heights of 2, 4 and 6 ft. and which can be made up in such a manner as to give height adjustments from table to cutting tools in increments of 2 ft. so that the cutting tools can be as high as 14 ft. or as low as 2 ft. in the up position. Lifting bails are provided so that the rail can be lifted by the overhead cranes and these blocks inserted or removed. The cross rail is a box type casting with a face of 48 in. and a depth of 69 in. Heavily ribbed, it is 52 ft. long and weighs 175,000 lb. A heavy steel fabricated camber beam is bolted to it to minimize deflection. Completed with saddles and drive equipment, the assembly weighs 230,000 lb. and is 65 ft. in over all length.

Coordination between saddle and ram feeds and table rotation is accomplished electrically by means of a synchro-tie system instead of by mechanical connections. Table itself is driven by two variable voltage, d.c. vertical motors of a minimum of 300-hp. each, and there is a transmitter motor on the side of each main drive housing. The synchro-tie receivers rotate at the same speed as the drive motor and furnish power for feeding their respective saddles or bars. In the table drive, a mechanical change of speed is effected by a pilot motor, and an auxiliary motor also shifts the feed drive in the same ratio.

Final table drive is by helical pinions engaging at opposite diameters.

All operations on the mill, such as starting the table, fast or slow, jogging or reverse; rams up, rams down or ram swiveling; saddles in or out, etc., are controlled from a pendant switch from either side of the mill. To perform all these operations electrically, there are 32 motors. Table speed range is from $\frac{1}{8}$ to 5 r.p.m. and is read on a large wall tachometer. At each end of the rail, there are large feed dials reading from $\frac{1}{32}$ to $1\frac{1}{2}$ in. per rev. The operator merely depresses a selected feed button until the pointer comes to the desired value on the dial. Four amber lights on the plate show the member and direction selected for movement. Other lights show when the feed is on or off and whether the member is set for ratchet feed or power operation. The equipment for operating each head is independent and is controlled by separate pendants suspended convenient to the cutting tool.

The mill complete has a weight of 705,000 lb. and the table capacity is 576,000 lb., making a total possible load on the foundation of 1,281,000 lb. The unit is supported on a series of 68 leveling blocks resting on steel plate caps on concrete piers. The whole foundation is carried on 120 concrete piles driven to hard pan. Passage ways provide access to the levelling blocks and to the main drive motors and gear housings.

Explosive Rivets For A

EXPLOSIVE rivets made by Du Pont, a recent innovation, may prove an important factor in speeding American aircraft production and simplifying design.

Now being manufactured in commercial quantities, the rivet contains a high explosive in a cavity at the end of the shank. Heat applied to the rivet head by an electric gun detonates the charge and the explosion expands or mushrooms out the hollow shank, thus setting the rivet. The whole operation is performed from one side with greater ease and speed than is possible by any mechanical means now being used in aircraft factories. Engineers estimate that from 800 fastening points in an all-metal pursuit plane to as many as 10,000 in the largest all-metal bomber are readily accessible from one side only. That fact has presented one of the most troublesome bottlenecks in the mass production of fighting planes. Under the best mechanical methods now employed, a skilled workman can set about two to four of these "blind" fasteners a minute after they have been placed in the holes. The equipment is comparatively costly.

The new Du Pont rivets may be set by one workman at a rate of 15 to 20 rivets a minute, once they are in place. The rivets themselves weigh only about one-fourth as much as generally used blind fasteners of mechanical design. So finely has the explosive charge been controlled, that the expansion it effects may be held within limits of 0.002 in.

Two years of experimental work by the explosive department of the Du Pont company, supplemented by extensive tests of the rivets on airplane production lines in recent months, stand behind the development. Engineers expect the invention to have wide applications in industry at large, and to effect radical changes in riveting methods and structural designs.

Much of aviation's phenomenal advance has been made possible by the development of the all-metal design, employing the lighter metals such as aluminum and magnesium alloys. This style of construction requires some 40,000 to 500,000 rivets or more per plane, according to the size. The job is one of the most exacting and tedious that confronts plane builders, and grows more so as planes become larger, which is the trend. For example, the recently completed B-19 Douglas bomber, largest ship of its kind ever built, is said to have 3,000,000 rivets.

Gang riveting machines, automatic hole punching and rivet-driving devices, and the limited replacement of rivets by spot welding, have tended to simplify the tremendous fastening problem to an important degree. However, these methods, together with the driving of conventional rivets individually by two-men crews—usually at a rate of two to three rivets a minute—are applicable only in assemblies which permit access to both sides.

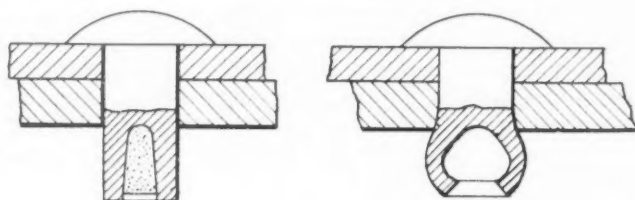
There are many structures or portions of airplane structures which are totally or partially inaccessible from the rear. These require fasteners capable of being installed entirely from one side, usually termed blind rivets. Many kinds of mechanical blind rivets have been developed, but in general they have compared unfavorably with "bucked" rivets in physical and structural properties, besides being difficult to install economically. So serious has been this difficulty that it has influenced air-

plane designs through the efforts of designers to avoid blind rivets.

In 1921, an American, Frank Allan, patented several types of explosive rivets and bolts which, he hoped, might prove the solution of the blind rivet problem. His rivets did not prove commercially feasible. However, in 1937, a patent (No. 2,080,220) issued by the United States Patent Office to Karl and Otto Butter, two brothers employed by Ernst Heinkel, builder of the well-known German plane bearing his name, revived the idea of setting blind rivets by expanding the shank with a minute explosive charge.

The development abroad was done by the Heinkel Werke, to whom the patent had been assigned, in cooperation with Dynamit Aktiengesellschaft (D.A.G.). North American rights to the invention were obtained by Irving Rossi, American banker, who had spent many years abroad. Later, in 1939, he formed the American Explosive Rivet Co. Europe was still at peace then. It was at about this time also that the Du Pont explosives department became interested in the idea and began seriously to explore its possibilities. From the outset, the Butter rivet seemed to offer advantages over any of the existing types of blind rivets and to have great promise, provided it could be further perfected and economically manufactured. Du Pont therefore brought the North American rights from the American Explosive Rivet Co. and began an intensive research and development program at its Eastern laboratory at Repauno, N. J.

LEFT: Explosive rivet in place before firing, showing powder charge in hollow shank. **Right:** Rivet set, showing characteristic shape into which explosive forces hollow shank end.



Aircraft

ONE of the biggest problems in airframe construction is driving rivets—by the hundred thousand, many of them in places readily accessible from the outside only. A rivet carrying a minute explosive charge that mushrooms the shank of the rivet when touched off by heat is the latest answer to the problem of driving small dural rivets blind.

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Apart from fundamental details, which the patent disclosed, many problems remained to be solved. The design had to be adjusted to American standards of precision, and a new method for manufacturing the rivet blanks was necessary since the very small tolerances or allowances for variations in size could not be met in existing equipment. The anodizing process, or treatment of the surface to prevent corrosion, had to be improved. Also, equipment for the extremely accurate loading of almost infinitesimal explosive charges had to be designed and constructed.

Finally, in the fall of 1940, after they had been tested and evaluated by the United States Army and Navy, the improved Du Pont rivets were sold in limited numbers to a few aircraft manufacturers for further testing and actual shop installations. These rivets were made on experimental tools but were loaded with powder on production equipment. Since then, working in close cooperation with American airplane builders, the multitudinous details of manufacture and use have been perfected. The sectional drawing shows the Du Pont rivet, in both the original and installed condition. Prior to installation, the rivet is similar to a solid rivet except for the cavity which is concentric with the shank and open at the end. The cavity holds the small explosive charge which, when heated to a certain temperature, detonates and expands the shank end uniformly without cracking. Due to the nature of the explosive, no wadding or



THE electric riveting gun for firing the explosive rivets is a simple device weighing less than 5 lb.

other type of confinement is required. The heat necessary to setting off the charge is supplied by means of a specially designed electric tool or riveting iron with a silver tip. It weighs less than 5 lb. The application of the iron to the die-formed head of the rivet is illustrated. Time of setting is $1\frac{1}{2}$ to $2\frac{1}{2}$ sec., from the time the riveting iron is applied until expansion takes place, and it is possible to fire 15 to 20 rivets per min. after they have been put in place by hand.

The rivets now being manufactured are of an aluminum alloy, of varying diameters and sizes to meet structural requirements. They are of the modified brazier head and countersunk types, the latter permitting the flush riveting required by modern high speed planes. The rivets are installed in the age hardened condition and do not require refrigeration after heat treatment, so necessary with solid rivets in the same alloy. In shear and tension, these rivets develop values which are approximately the equivalent of power driven rivets, the type now most widely used.

These rivets may be used without fear of serious injury, but they should be handled with reasonable care. Numerous safety tests have

indicated they will not detonate in mass and are quite insensitive to shock and friction. As would be expected, fire or high heat of any kind will cause them to expand.

Those who have been close to the research and development work feel confident the invention will be increasingly helpful in solving many aircraft production problems. Abroad these rivets have also found use in making quick patch repairs in the field. To close up a ragged hole left by bullets passing through the skin, it is only necessary, for example, to trim the hole with a portable power shear, form a dural patch to the desired shape, drill the rivet holes and install them as described for regular production work. In a wing member, such rivets might have to be driven completely blind.

In addition to their use in aircraft, it is believed these rivets may find many applications in other industries. Manufacture in still larger sizes, and in other metals, including steel, does not seem beyond the realm of possibility as now viewed. Time alone will develop the full picture.

How to Spray Stainless

METAL spraying is fundamentally a simple, relatively inexpensive operation; an essential aid to modern industry. Increasing applications and new uses, together with improvements in technique, have firmly entrenched the process as a salvage tool of the first order. Size of the part to be sprayed is not a limiting factor, nor is the type of coating that is to be applied. The process is particularly useful in reclaiming shafting of all descriptions and uses; hydraulic rams, rolls, etc.; and especially those items which are subjected to the corrosive action of untreated water.

Interest in the spraying of stainless steel can readily be understood when it is considered that the General Electric plastics department at Pittsfield, Mass., has 400 hydraulic presses in operation, utilizing 424 rams ranging in size from 3 in. diameter by 18 in. long, to 24 in. diameter by 36 in. long. The rams are made from cold rolled plain carbon machine steel and operate in a hydraulic system containing 10,000 gal. of water, with an hourly makeup of 400 gal. This last factor renders treatment of hydraulic water too costly to be considered as a means for preventing corrosion of press rams. Among other things, high oxygen content of the water causes excessive pitting of the ram surfaces, and with that, increased wear of ram packings and further water losses.

Under such conditions, it was natural that a search should be made in the direction of a non-corrosive coating for the rams. Several types of coatings were investigated, and surfaces sprayed with stainless steel proved to be the most satisfactory and economical, since sufficient coating could be applied to guarantee protection against the corrosive action of water. An important factor in-

By **C. F. BENNER**
*Metallurgist, Plastics Department,
General Electric Co., Pittsfield, Mass.*

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fluencing this selection was that, in addition to all new rams being sprayed, all rams on hand could be reclaimed, no matter how badly pitted they were.

Salt spray tests, on 1-in. diameter S.A.E. 1015 cold-rolled steel bars 8 in. long, prepared in accordance with standard metallizing requirements, strongly indicated that stainless steel would be quite satisfactory for this application. After 546 hr. in the spray, the bars showed no indication of pitting, and the test was discontinued. These results, based on previous data as to coating life, indicated that the rams should operate at least 5 years in the hydraulic system without pitting. This figure is being confirmed by data accrued under actual operating conditions. In fact, recent checks lead to the belief that some of the rams may last as long as 10 years before recoating is necessary.

The spraying of stainless steel is essentially the same as the spraying of plain carbon steel. The process itself may be broken down in three distinct divisions, namely: (1) preparation, (2) spraying of the metal, and (3) finishing. Each operation is important, but too much emphasis cannot be placed on the first step, for therein lies the success of the metallizing process, and the ultimate usefulness of the job.

The bond between base metal and sprayed metal is strictly mechanical. Because of this condition, a strong bond is dependent upon the following factors:

(a) The proper roughing of the base material to form grooves, or openings, for the sprayed metal to penetrate, thus keying the coating to the base metal.

(b) Having the base metal absolutely clean and free from grease, oil, water or oxide films, which form a layer between the base material and the sprayed metal, thus making it impossible for intimate contact.

(c) The sprayed metal being finely atomized, so that the molten particles are small enough to penetrate the smallest openings of the prepared surface of the base material.

Inasmuch as the bond is mechanical, it follows that the proper roughening will determine the ultimate success and soundness of the sprayed coating. This roughening, or preparation step, may be accomplished by blasting or, by undercutting and grooving followed by roughening with a preparing tool (Fig. 1). While the former may be used, it is believed to be not as desirable as the latter. It is the practice in the author's plant that for hydraulic rams it is essential that the surface be undercut and threaded; for in this manner full advantage of the keying action of the threads is obtained, thus naturally, increased mechanical strength of the bond. In salvaging old rams that are badly pitted, the surface must be turned down so that the pitted areas will be completely removed and sound metal exposed to the spray.

The amount of undercut required will be dependent upon the size of the shaft and the thickness of coat needed to serve as protection against wear; or in the case of hydraulic rams, pitting. The Metallizing Engineering Co. of New York, has determined the following

Steel

—The metal spraying technique, and the tools and methods for surface preparation, all based on years of successful plant practice.

minimum coat thickness which is dependent on shaft diameter:

Diameter	Minimum Coat Thickness
1 in. or under	0.010 in. on the radius
1 in. to 2 in.	0.015 in. on the radius
2 in. to 3 in.	0.020 in. on the radius
3 in. to 4 in.	0.025 in. on the radius
4 in. to 5 in.	0.030 in. on the radius
5 in. to 6 in.	0.035 in. on the radius
6 in. or over	0.040 in. on the radius

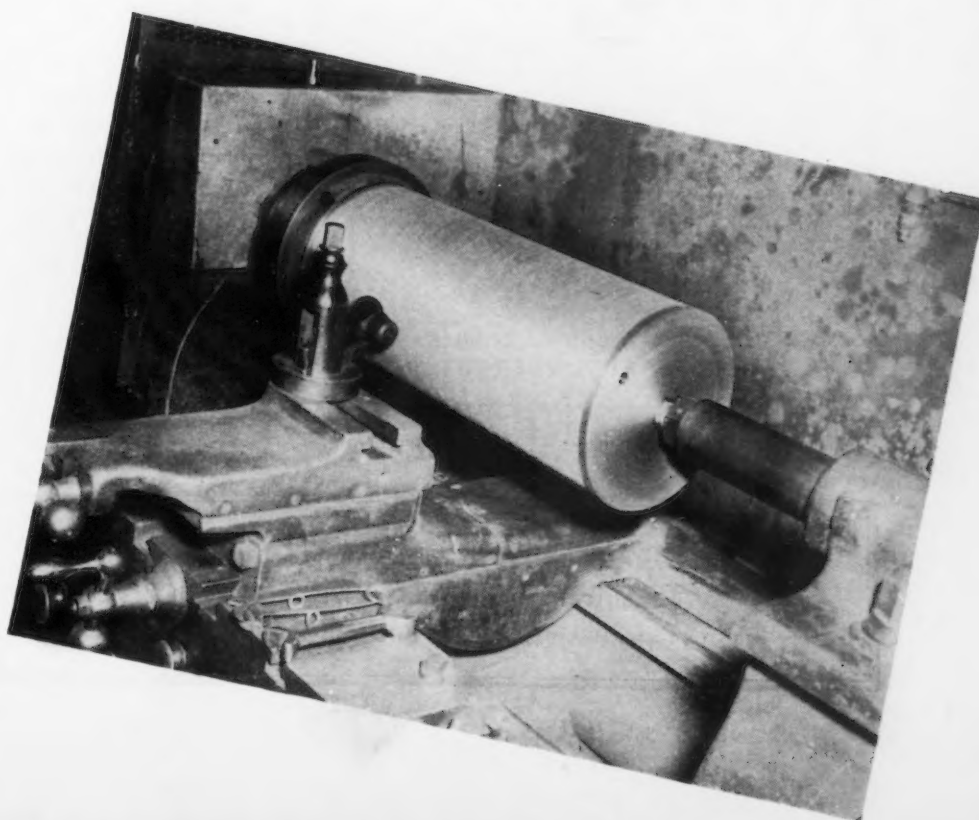
Thus, in preparing a new ram for spraying, say 6 in. in diameter, it must be undercut at least 0.040 in. on the radius, or 0.080 in. on the diameter. Sometimes a wear factor must be taken into consideration, which is the amount of metal which must be applied (via spray) to take care of wear after the piece is put into service. This is called wear allowance and must be determined for each individual job and may vary from 0.001 in. to 0.050 in. In these cases, undercut equals minimum coat thickness plus wear allowance (Fig. 2).

In those instances where a ram is badly pitted, or a shaft is unevenly worn, it is advisable to undercut in steps (Fig. 3), in order to save spraying time and metal. It has been found advantageous to dovetail each of the steps just as the ends are, thus gaining additional locking action and strengthening of the bond. The deepest step is sprayed first and just as if it were the only part of the shaft to be sprayed. When it has been built up to the level of the next step, the action is extended to take in the entire surface at this level, and so on. The angle of the dovetail is not over 20 deg., and is usually located about 1/32 in. from the end of the ram. Aside from increased bond strength, the dovetailed end prevents the relatively low tensile sprayed metal from spalling and also prevents seepage between coating and base metal.

After undercutting to produce sound base metal, the ram is grooved, or threaded, with a tool



THE press ram set up in the lathe (top) is being metal sprayed with stainless steel. The lower view shows a press ram set up for grooving and roughing.



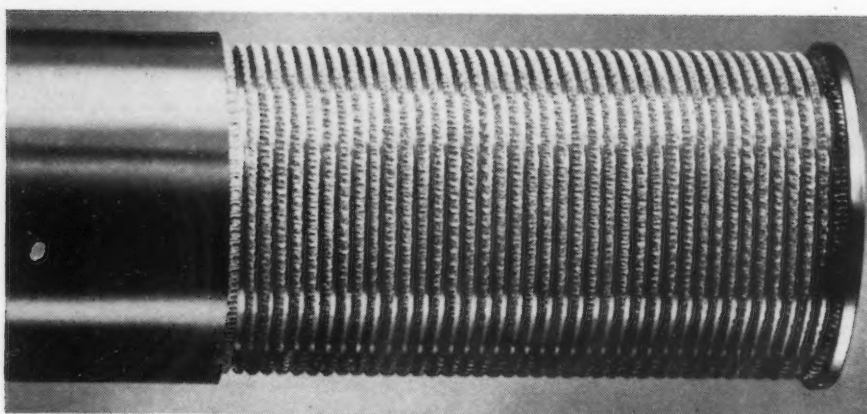


FIG. 1—Surface may be undercut and grooved followed by roughening with a preparing tool.

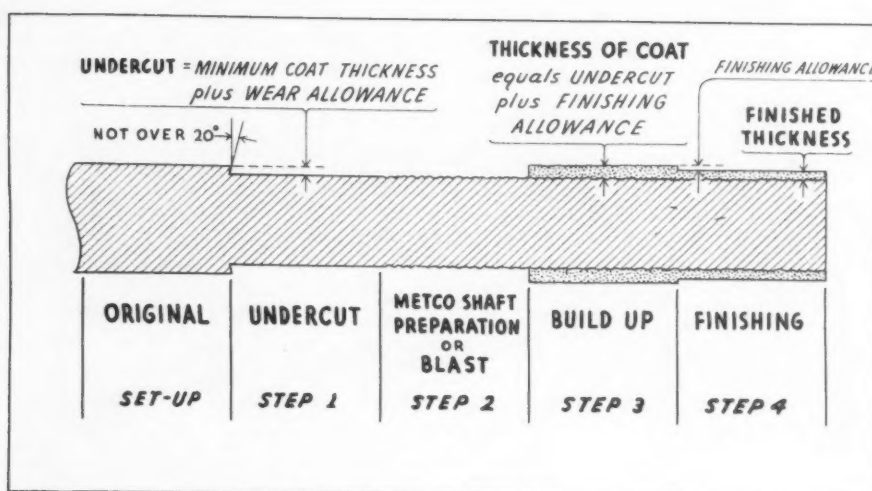


FIG. 2—This procedure is followed to take into account a wear allowance.

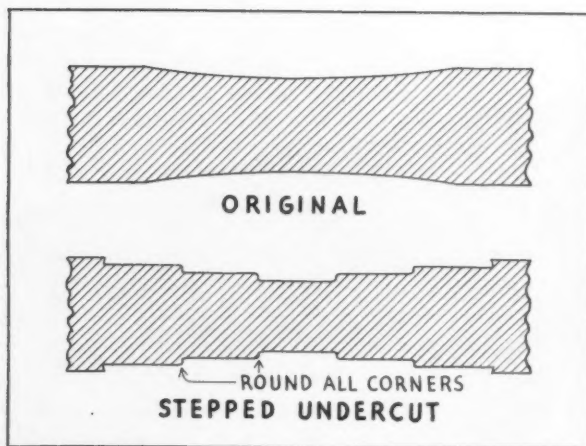


FIG. 3 — Where there is bad pitting or uneven wear, it is advisable to undercut in steps in order to save spraying time and metal.

THIRTY-FOUR in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

bit ground as shown in Fig. 4. A standard $\frac{1}{8}$ in. cut off blade, ground on the side, and rounded on the end, makes an excellent tool for this purpose. These grooves are cut 0.025 in. deep and are made by using the lathe lead screw and cutting a continuous thread. The thread feed should be set at 16 threads per in. for steel, and 14 threads per in. for cast iron (see Fig. 5). It will be noticed that $\frac{1}{32}$ in. allowed between the dovetailed shoulder and the first groove or thread. The reason for this is to permit the sprayed metal to fill the first groove.

The next step is a roughening operation, which breaks and spreads the tops of the ridges and also rolls over the edges of the ridges. This is best accomplished with a special shaft preparing tool which is mounted in the tool post. This tool is passed back and forth (about three times) across the tops of the ridges, while the work is rotating, thus roughening and spreading the tops of the ridges to produce a dovetail effect on each groove. By following this procedure, a superior bond can consistently be obtained (Fig. 1).

It is most important that the ram or shaft be kept dry and free from oil or grease at all times. Anything that interferes with the cleanliness of the base material will be detrimental to the bond between base material and sprayed metal. This item is considered so important that the cleaning of the ram with a good organic solvent just before spraying has been established as part of the regular operation.

The ram is now in a satisfactory condition for spraying. A standard metallizing gun is used, and stainless steel—No. 11 B&S wire size—of the following analysis is sprayed: C 0.060, Mn 0.57, Cr 20.00, Ni 9.75.

On spraying the shaft, the first passes should be made with the gun held at an angle of about 45 deg. to the work (Fig. 6). Then, while the work is rotating, the spray will be directed so that the apex of the angle is toward the head stock, and on the way back, toward the tail stock. By so alternately spraying each side of the thread, metal is deposited under the edges of the dovetail, and the threads are built

up uniformly. After several passes in this manner, the gun is mounted in the tool post holder and the balance of material is sprayed perpendicular to the work.

If the piece that is to be sprayed is 2 in. in diameter or under, it should be turned at an r.p.m. which will give a surface speed of approximately 35 surface ft. per min., and the carriage feed should be set at $\frac{1}{8}$ in. per rev. If the piece is over 2 in. in diameter, it should be turned at an r.p.m. which will give a surface speed of approximately 50 surface ft. per min., and the carriage feed should be $\frac{1}{6}$ in. per revolution. For example, on spraying an 8-in. ram, it should rotate 24 r.p.m. and have a carriage travel of 4 in. per min. With these settings, a deposit of 0.0035 in. to 0.004 in. per pass will be made, or about $3\frac{1}{2}$ lb. of metal per hr. Should the surface speed be increased, or the carriage feed made faster, the result will be simply that each pass of the gun across the shaft will apply a lighter coat, and vice versa, if the surface speed and carriage feed are decreased.

In those cases where much metal has to be removed to eliminate unsound metal, as in Fig. 3, it is desirable and economical to build these areas up with the cheaper plain carbon steel, and follow with the stainless, so that at least 0.040 in. of the latter will be deposited, to provide the necessary corrosion protection.

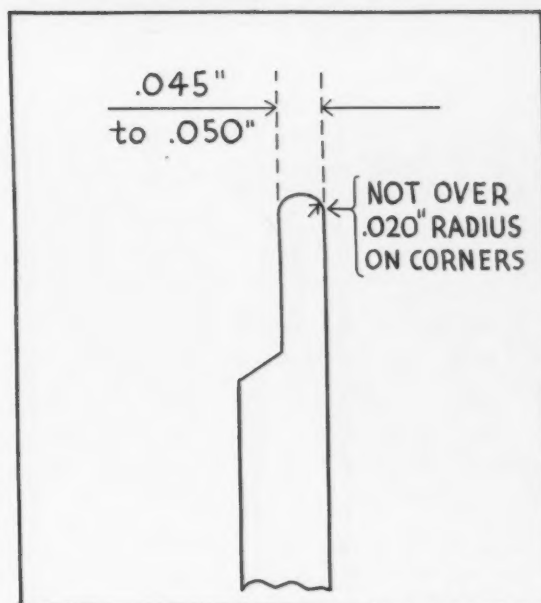
When spraying has been started on a ram, it should be carried through to completion without interruption. Any prolonged interruption between passes will naturally result in slight oxidation of the surface, and materially weaken the bond at this point, thus shortening the ultimate life of the ram.

After spraying, the rams are ground to size rather than machined, then ground. It was found that direct grinding was more economical when the correct grinding wheels were used.

At present the plant is using a 20 x $4\frac{1}{2}$ x 5-in. wheel No. 46K5BE Alundum type, Bond B Vittrified. Recent trials of a No. 5746L5BE wheel seems to indicate even better results.

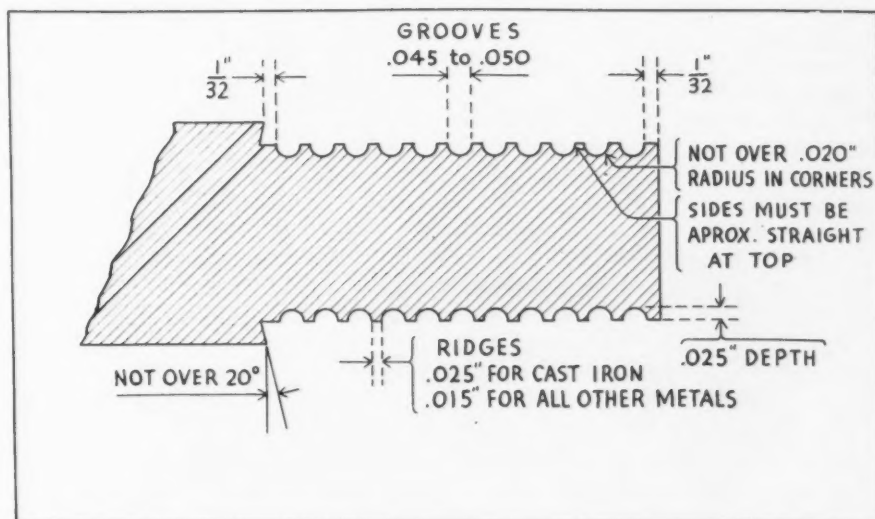
Another type wheel, the 401-P-30 Aloxite Vittrified is also used successfully for grinding sprayed stainless steels.

FIG. 4—The ram is grooved, or threaded, with a tool bit ground as shown here.



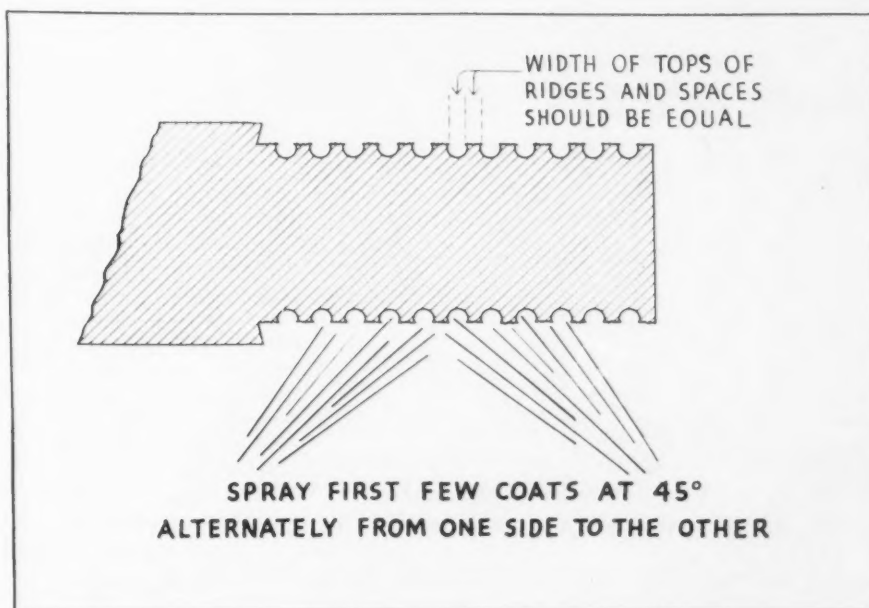
BELOW

FIG. 5—The thread speed should be set at 16 threads per in. for steel, and 14 threads per in. for cast iron.



BELOW

FIG. 6—The first passes should be made with the gun held at an angle of about 45 deg. to the work.



Inspection of Ordnance

IN order to show just how the ordnance inspection system works out, it is proposed to trace the manufacture of the caliber .30 machine gun belt links through the shop. The material for these links is purchased on U. S. Army specification 57-136-1C and must fulfill the requirements as set forth in the following table:

Carbon	0.59 to 0.74 (0.65 preferred)
Manganese	0.40 to 0.60 (upper range preferred)
Silicon	0.30 max.

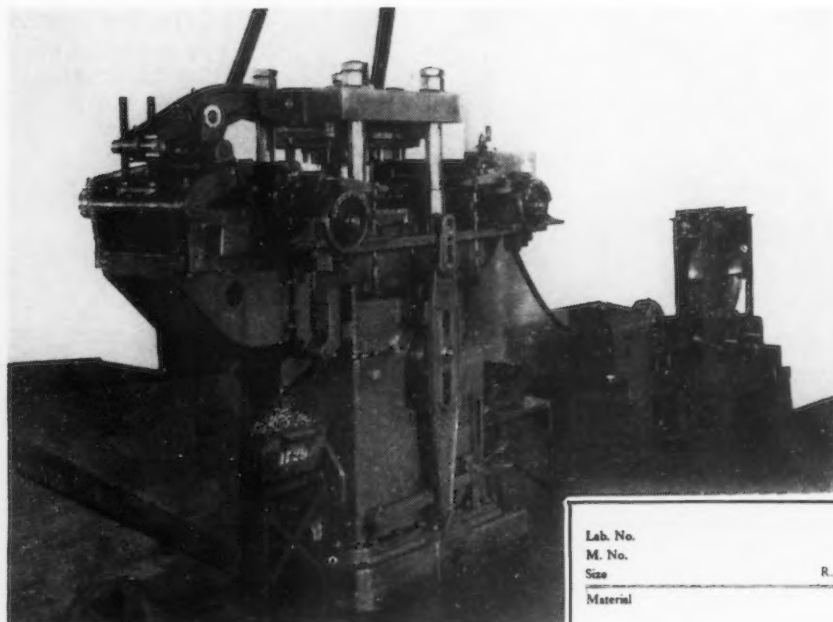


FIG. 18—Dieing machine (50 ton) and stock feeding mechanism for caliber .30 metallic belt link.

Phosphorus	0.04 max.
Sulphur	0.05 max.
Tensile strength, lb. per sq. in. =	65,000 min.
Elongation in 2 in. =	20 per cent min.
Rockwell "B" hardness =	75 to 82
Structure = spheroidized. To have a grain size of No. 4 to No. 8 (A.S.T.M. grain size classifications E 19-33).	
Size =	0.024x1.187 in.

The material is purchased in

rolls weighing from 100 to 125 lb., stacked on skids to a height of not more than 36 in.

Upon receipt at Rock Island Arsenal, the material is first inspected for mill heat identification. A sufficient number of samples are then cut from random rolls to assure a fair cross section of the shipment. These samples are forwarded to the laboratory accompanied by a request for test, Fig. 17.

At the same time, a sufficient number of rolls to form 200,000

links are forwarded to the press department for a working test. The results of the working test are furnished to the laboratory where they are recorded with the laboratory test, on the request for test form which also acts as a laboratory report form.

Upon receipt of the samples with the request for test, it is assigned a laboratory number. Samples are milled in the laboratory shop and forwarded to the chemical laboratory for chemical analysis. In this same shop tension specimens are made up for physical tests. Additional samples are cut and forwarded to the metallurgical section for a macro-etch and an examination of the spheroidized condition of the material together with an examination for grain size. This grain size is the as-received grain size and is not the primary austenitic grain size.

o o o

FIG. 17—Form which is used for the request for test, and also for setting down the results of the test.

Request for Tests (METALS)		Rock Island Arsenal, _____, 19__	
Lab. No. _____	M. No. _____	R. R. No. _____	
Size _____	Material _____		
Heat No. _____		Please make tests as indicated below	
Ordered from _____	Chemistry _____		
Delivered by _____	Physics _____		
Purchase Order No. _____	Macro _____		
Item No. _____	Magnaflux _____		
Ex. O. No. _____	Lay-out _____		
Amount received _____	X-Ray _____		
Charge to _____	Ballistic Test _____		
Date received _____	Compliance w/spec. No. _____		
REMARKS: _____	REMARKS: _____		
_____	RECOMMENDATION OF LABORATORY		
_____	Accept <input type="checkbox"/>	Accepted <input type="checkbox"/>	
_____	Reject <input type="checkbox"/>	Rejected <input type="checkbox"/>	
_____	Laboratory _____	Inspector _____	

Material

By P. C. CUNNICK

Materials Engineer, Rock Island Arsenal,
Rock Island, Ill.

—A continuation of last week's description of procurement procedure and methods whereby materials are checked for armament manufacture. Herein, the manufacture and testing of a caliber .30 machine gun belt link are described.

Should the laboratory tests prove satisfactory, the results are forwarded to the inspection department together with a recommendation for acceptance. The inspection department then completes its receiving report, sending the receiving report together with a copy of the laboratory report to the finance department for payment.

Assuming that the shipment has been accepted, it will then be forwarded to the press department for the forming operations.

The manufacture of this component entails three complete operations together with a final inspection prior to packing. These operations are: forming, heat treating, plating, final inspection and packing.

The forming operation is carried out in a multiple step die on a 50-ton dieing machine shown in Fig. 18. This photograph also shows the feed mechanism with a roll in position.

Prior to mounting the roll in the feeding mechanism, it will have been carefully inspected for split edges, camber, width, thickness and surface condition. This operation is carried out on every roll regardless of the fact that the shipment, as a whole, may have been accepted by the final inspection department.

Every time the press closes, all of the operations as shown in Fig. 19 are carried out, the last operation consisting of cutting the finished link from the strip and dropping it into a tote pan at the discharge end of the machine. This machine is entirely automatic, leaving the press operator plenty of time to watch the detailed operation of the machine.

The operator is supplied with various sized plug gages. He is continually checking the center distance between the loops, the space at the double loop end and the clos-

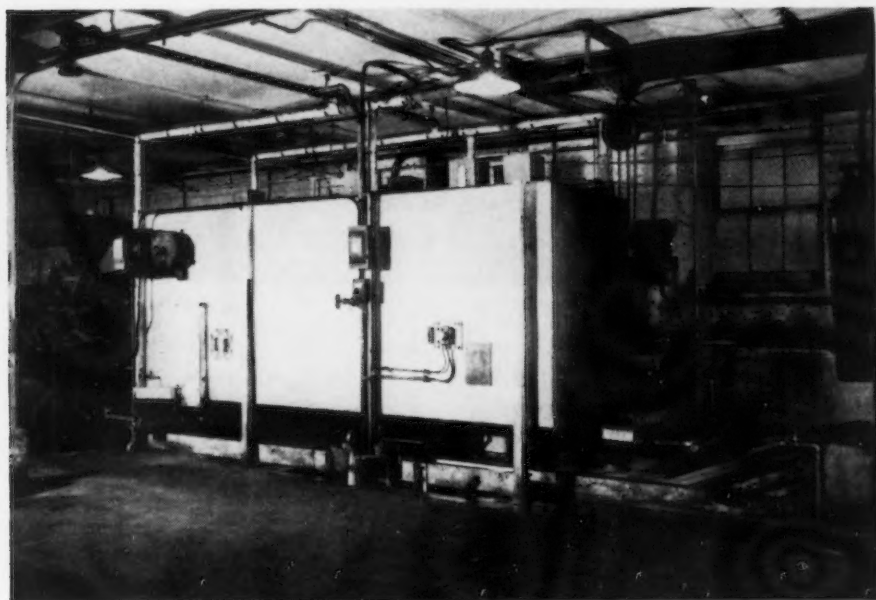
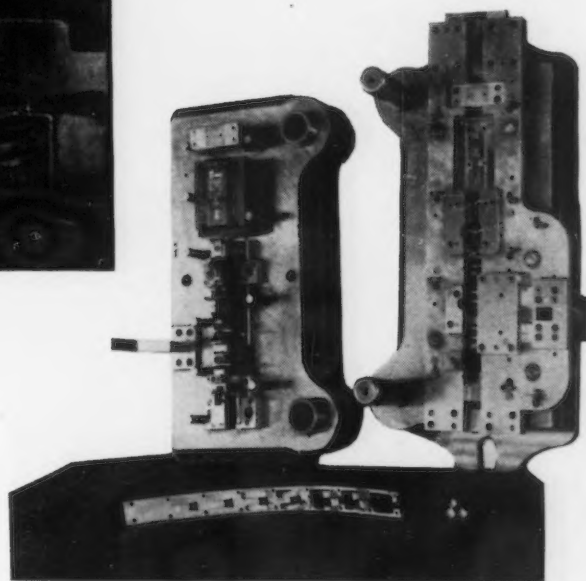


FIG. 20—General Electric tempering furnace for belt links.

RIGHT

FIG. 19—Die for stamping out the caliber .30 metallic belt link. Also shown is the steel strip and link.



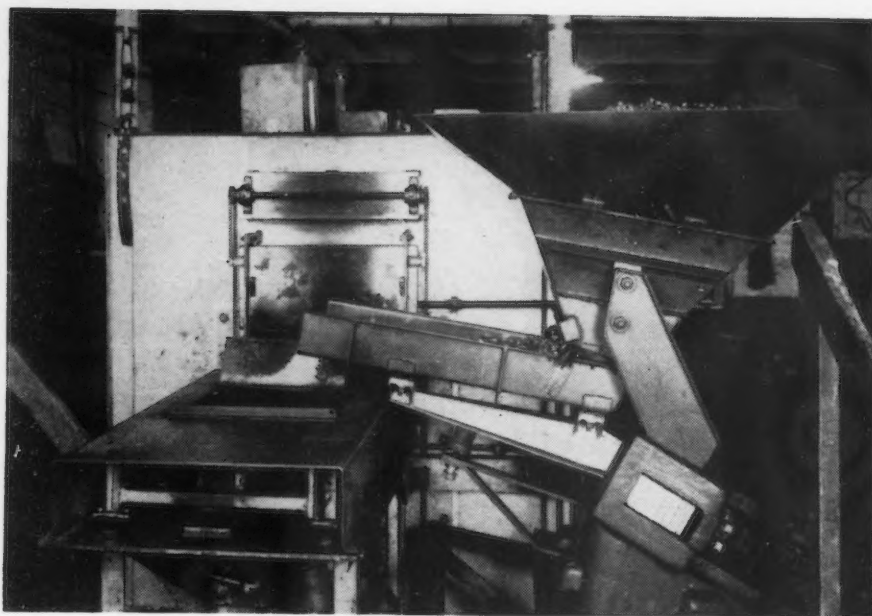


FIG. 21—The links are fed into the tempering furnace by means of this vibrating hopper.



FIG. 22 — Apparatus for measuring thickness of zinc coating. This is the Hull and Strausser method.



FIG. 23—Salt spray apparatus for measuring the corrosion resistance of the links.

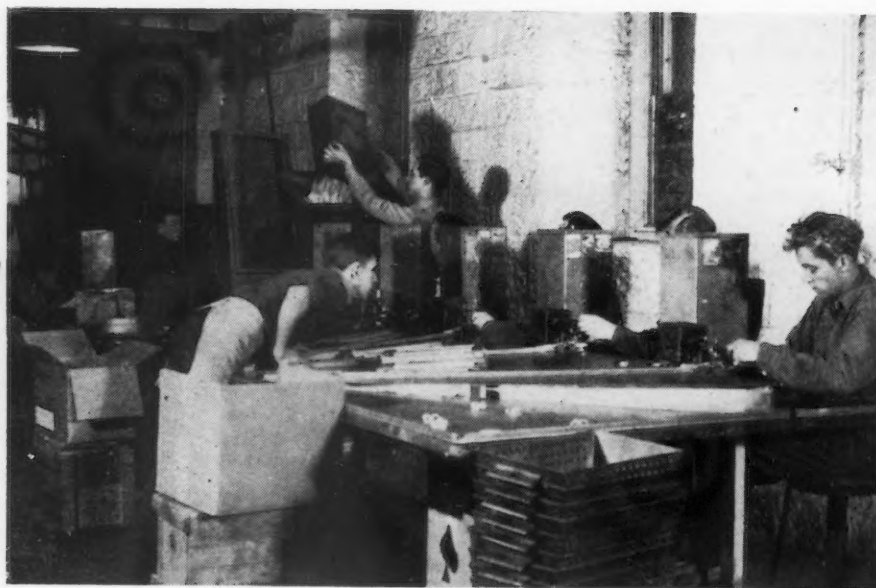


FIG. 24—Final inspection and packing of the links.

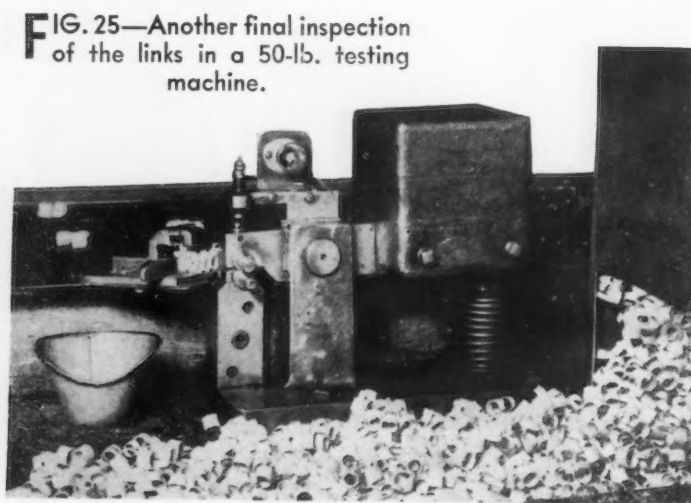


FIG. 25—Another final inspection of the links in a 50-lb. testing machine.



FIG. 26—The 50-lb. testing machine of Fig. 25 is shown here in operation.

ing of the loop, and the condition of the burr on the edge of the loop left by the blanking die.

Should any of these defects show up, he would immediately contact the inspector on the job who would, in turn, call the foreman in charge of the die manufacturing department. Such difficulties may entail the removal of the die for regrinding or even the rejection of a coil due to fracture of the strip as it passes through the die. Should it be a strip fracture, the laboratory would be called in to examine the material for lamellar pearlite, dirt or brittle condition; any of which would be cause for rejection of the material. In any event, the press would be stopped until the source of the difficulty had been determined and corrected.

This press operates at the rate of 120 compressions per min. so that if not carefully watched, a great number of rejected links would soon pile up.

The loaded tote pans are carried to the heat treating furnace located in the same room. This furnace, Fig. 20, is a large box type continuous belt atmosphere controlled furnace which is adjusted to require seven min. for the trip of the link through the heat.

The links are fed into the furnace by means of a vibrating hopper, Fig. 21, which automatically feeds the links onto the conveyor belt. The links are discharged at the outlet end through a chute which terminates under the oil, thus eliminating any possibility of exposure to oxygen.

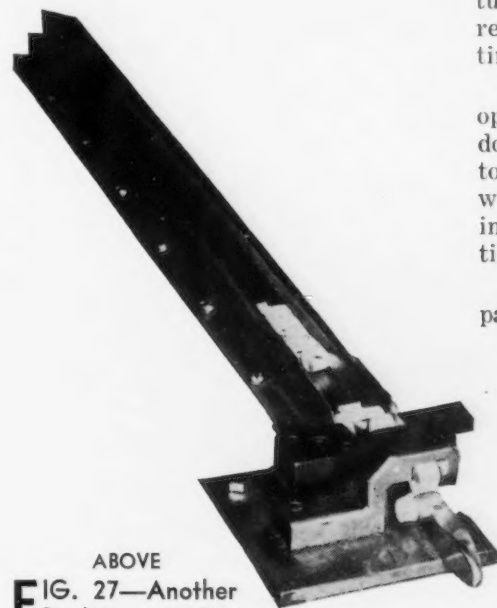
A conveyor belt automatically conveys the links from the quench tank to the wash tank from which they are again conveyed by means of an endless belt into a large basket preparatory to introduction into the tempering furnace. Here, again, all operations are automatic.

The operator acts somewhat as an inspector, continually checking the heat treatment by snapping the links between the thumb and finger to assure himself that furnace temperatures are up and the furnace time is correct. Either of these conditions would be indicated by links which would not snap but would take a permanent set. If the latter were the case, the furnace operator would first check his pyrometers for proper temperature and then note the furnace time. If both of these conditions were correct, he would then immediately contact

the laboratory for a check on the material.

Upon being notified, the laboratory would investigate the material for carbide solution, chemical analysis and normal or abnormal condition of the steel. Usually procedure correction for some such condition suffices to again produce satisfactory links.

The links are then moved to the tempering furnace where they are tempered in a homo-furnace at a temperature previously determined by experiment to give satisfactory results. This temperature is quite low (525 deg. F.).



ABOVE
FIG. 27—Another final inspection test for the links. This is a distortion gage.

RIGHT
FIG. 28—Carton opening machine for the metallic belt links.



After tempering, the links are sand blasted in order to close the loops somewhat and to remove burrs which are nearly always present on the blanked edges of the loops as well as to remove the small amount of scale formed in the furnace which would interfere with subsequent plating operations.

After sand blasting, the links are again checked for loop closure, removal of burrs and hardness. This hardness test is similar to the one after the quenching operation

and consists of compressing the double loop between the thumb and finger and noting the result. If the link breaks, it is an indication that the tempering temperature had been too low. If the link bends, it is an indication of too high temperature. In either event, pyrometers would be examined immediately for temperature and corrections made.

In case temperatures were satisfactory, the laboratory would be called in for an investigation of the steel to determine whether the draw temperature for that particular heat worked satisfactorily. If it is found that the heat is of such an analysis that the draw temperature should be changed, this correction would be made before continuation of the work.

At the conclusion of the drawing operation, links are chosen at random and put over the packing table to be sure that the treatment was working successfully before sending the links on to the next operation, which would be plating.

If this preliminary test over the packing table proves successful, the

links are forwarded to the plating department where they are plated in barrel-type plating mechanisms with 0.00018 in. thickness of zinc. These plating barrels hold about 35.5 lb. of links. The plating operation requires about 1 hr.

At the conclusion of the operation, links are taken from each plating barrel for a test of the thickness of the coat. This determination is made by means of the Hull and Strausser spot test, Fig. 22, in which the drops are regulated to

fall at the rate of 90 to 110 drops per min. The solution is so standardized as to show 0.00001 in. per drop. The minimum requirement, as noted above, is 0.00018 in.

Should the plating fail or should the links show spottiness or a thinness of coat on the inside of the loops, as indicated by a dark condition of the metal, the laboratory

successfully. On such occasions, it has been necessary, at times, to empty the entire solution, thoroughly clean out the tank, chip out the zinc trees formed in the tank and start over. Such a procedure is usually a cure for the difficulty.

Even though the coating proves satisfactory by the Hull and Strausser method of inspection, it is a

ipate any difficulties before great quantities of links have been run.

At the conclusion of the plating operation, the links are forwarded to the packing department where they are given a final test and packed, Fig. 24. This test is carried out by shop boys. A 100 per cent test of the links is performed. This test is, in reality, a repetition of all the tests that have been carried out before. Each link is slipped over pins, simulating the cartridge, mounted on a cam driven weight appliance, Figs. 25 and 26.

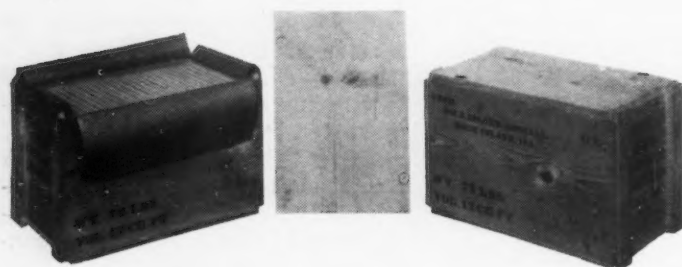
Should the link sustain the applied weight, it is removed from the pins and pushed into the chute which conveys it down to the packer. The mouth of this chute is fitted with a space gage, Fig. 27, which automatically gages the distance between the double loops and the location of the double loops with reference to the single loops. Should the links fail to withstand the load, a pilot light on the machine is automatically lighted and the link is removed from the pins and placed in the rejection chute which conveys it to the receptacle for this purpose.

Although each link is tested 100 per cent by this method and practically every dimension on the link is checked, the inspector on the job is continually rechecking links at random by hand, forming chains and making twist tests, all of which is carried out for the express purpose of delivering a component which, under the most severe conditions of use, will not cause jamming of the machine guns.

At the end of the packing chute, the links are placed in cartons containing 20 links per carton, Fig. 28, and packed in boxes for shipment to the field, Fig. 29.

A record is kept of each day's run which separates the rejected links into the various causes for rejection. A sample of such a record is shown in Fig. 30. Copies of this report are forwarded to five different departments, all of which are vitally concerned with the manufacture of the machine gun belt links.

Thus, it is seen that every effort is made to supply the machine gunner with a product which not only will give every satisfaction from the standpoint of operation but in which he may have every confidence that the component is of such a high standard of quality that his life will never be in jeopardy due to a failure of the product.



ABOVE
FIG. 29—Method of packing the links for shipment.

o o o


RIGHT
FIG. 30—This report of a day's run separates rejected links into the various causes for rejection.

AT	
PM	
KMT02	
DA-24	
DS	
DAILY INSPECTION OF LINKS	
30 CALIBER	DATE 1/11/41
Quantity Inspected	234,571
Quantity Accepted	230,000
Quantity Rejected	4,571
Cause of Rejection:	
Links Set on Test	1,432
Links Broken on Test	
Links Received Bent	1,306
Links Received Broken	578
Links Distorted—Holes Large	600
Heat Number	6491
Lot Number	5210-11-12-16-29
REMARKS: Links with .375" dim. too wide 655	

is immediately notified and a check of the solutions is made. This is in addition to the three checks a week made as a regular procedure.

Should the solution be brought up to standard chemically and the links still show bad, the electrical system and link preparation would be examined, with proper corrections being made. It frequently happens that even after these precautions, links still fail to plate

routine procedure to take links at random from each day's run and expose them to a salt spray test. This salt spray is carried out in a cabinet such as shown in Fig. 23. The spray consists of a 20 per cent salt solution (NaCl) in distilled water. The links must withstand this spray for a period of 48 hr. This test is demanded by the specification, whereas the Hull and Strausser procedure is a method used to antic-



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Study the matching of the diamonds on this factory floor. See how "A.W." Rolled Steel Floor Plate presents a uniform pattern over the entire floor—safe for foot or wheel traffic. No cracks or ridges. No worn or slippery surfaces. "A.W." Floor Plate can be cut to any shape and installed without disturbing production. Fire-proof, oil-proof, heat-proof, crack-proof. Easy to clean, quick to drain. Made in five patterns—the Super-Diamond Pattern is shown here. Write for illustrated folder.

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DETROIT—The defense production program, with its emphasis on sub-contracting for manufacture of parts and sub-assemblies, is producing for America one of the most gigantic materials handling problems of all times. Wide-spread sub-contracting means a consequent large-scale decentralization of defense industry. Because of this decentralizing, assembly lines now are stretching from factory to factory—no longer does a single building, or group of buildings at one site, contain whole manufacturing processes.

This trend is not new to the automobile industry, which has flung its production empire literally from coast to coast, but it is distinctly new to a host of other industries which are vital in the defense set-up. Today an increasingly large volume of material and parts is being moved by day and by night—from Detroit to Flint and Saginaw; to Indianapolis, Dayton and Memphis; from Hartford, Conn., and Paterson, N. J., to Seattle and San Diego, and from both automobile and airplane plants to new assembly buildings at Tulsa, Oklahoma City, Kansas City, Dallas, etc.

The anticipated upswing in defense output in 1942 will multiply the demand for all forms of transportation, but especially for flexible handling of the parts that must be moved from machines to assembly floors. The demand for transit of industrial products already is reflected in increased flow of traffic, greater car-loadings and pressing demand for railroad car steel and automotive trucking equipment.

Keep the "Float" Down

Especially interesting to the automobile industry, and important to hundreds of suppliers, is the greater demand for highway transportation to link the producing units of defense industry. This is a transportation problem, but it is no less one of factory materials handling. Special equipment designed to solve this materials handling problem is beginning to make its appearance. In the entire defense program probably there is no more spectacular use of motor transport than one recently adopted by Cadillac to haul newly manufactured airplane engine parts from Detroit to Allison at Indianapolis. Special insulated and temperature-controlled trailers are employed, with the goal of maintaining low humidity and steady room temperature en route. The purpose of this is to protect parts, such as highly machined crankshafts, against corrosion due to condensation of moisture in transit.

Since World War I problems of industrial transport

On The Assembly Line

BY W. F. SHERMAN

Detroit Editor

• Defense program results in huge materials handling problem . . . Cadillac uses temperature-controlled trailers to haul airplane engine parts . . . Ford now has school space for 10,000 student mechanics.

have changed vastly, principally due to the modern concept of materials flow, scheduling and handling. It is no longer considered necessary, efficient or economical to have large "floats" of stock or large volumes of material en route and in warehouses previous to final assembly. The goal now, as expressed in automotive practice in recent years, has been to keep the "float" as low as possible, consistent with avoidance of interruptions in production.

Also since World War I the transportation facilities of the nation have changed. Twenty-five years ago the railroads were called upon alone to handle the transportation of materials for defense. However, since then there has been a decrease of 27 per cent in the number

of freight cars in service on Class I railroads in the United States, with the number of cars dropping from 2,263,015 in 1914 to 1,650,031 in 1939. At the same time the railroad track mileage decreased eight per cent, from 255,037 miles to 235,064 miles between 1914 and 1939. Parallel with this was a growth in the registration of motor trucks and trailers from 85,600 vehicles in 1914 to 5,500,000 in 1940, an increase of 6400 per cent. And hard-surfaced roads of the nation increased 466 per cent, from 257,000 miles to 1,200,000 miles. Today 48,000 communities, many of them housing new defense plants, are served only by truck transportation.

Faced by the possibility of material shortages and curtailment of production the motor truck industry has begun to feel a pressing need for official priority consideration that will enable it to keep up its production and sustain this vital part of the country's transportation system. Fruehauf Trailer Co. has sought out some of the definite proofs that motor transport is an important factor in the defense program. From 400 or more transport operators it has obtained specific information to illustrate the tie-up between highway transportation and industries in defense. Its data largely concerns the transport of goods for plants in the metal working industries.

Much Moved by Truck Trailers

Cooperating with Fruehauf, highway operators report that in the early months of this year as much as 60 to 65 per cent of their operations consisted of the hauling of steel, or iron and steel products used in defense industry. A surprising volume of heavy materials is being moved by truck-trailer combination. One reported contract calls for the movement of 100,000 tons of ship plate and shapes along the eastern sea-

Tapping Trouble?

**CHECK
THESE
POINTS**

If your taps are breaking, or not cutting smooth, proper size threads, it may not be the taps' fault. Here are a few things to check to help you locate and correct tap trouble

TYPE OF HOLES TO BE TAPPED

If a blind hole, is there sufficient untapped space at the bottom for the accumulation of chips?

Is a "Gun" tap that shoots the chips ahead being used? (In a blind hole tapped very nearly to the bottom and having no recess, the "Gun" tap is not recommended.)

Do conditions call for a two or three fluted tap?

CLASS OF FIT REQUIRED

If the tap produces an oversize hole, has the proper tap been selected for the class of fit desired?

If proper tap is being used, is there any play in the work or tap holding spindles (provided rigid spindles are being used)?

Do the work and tap line up accurately?

Is the tap dull?

TYPE OF MACHINE

Is drive uneven because of slipping belts?

Is machine powered properly?

Are tap and drilled hole in alignment?

Is there undue wear on sliding parts?

TAPPING SPEEDS

Is the speed too slow?

Is the speed too fast?

TAPPING DIFFERENT MATERIALS

Has the tap proper cutting face for the particular material being tapped?

Is the tap of the proper design or type?

PROPER HOLE SIZES BEFORE TAPPING

Is the drilled hole of the proper size?

Is the drilled hole perfectly round?

Is the axis of the hole parallel to the axis of the tap?

LUBRICATION

Has the proper lubricant been employed?

Does the lubricant flood the tap sufficiently while engaged in the hole?

Is there sufficient force behind the lubricant to wash away the chips?

If applied with a brush has the lubricant a sufficiently heavy body to adhere to the tap? (A light lubricant will be thrown off the revolving tap before it enters the hole.)

TAP HOLDING DEVICE

Is worn or wrong type of holder being used?

Is holder in alignment with drilled hole?

CHAMFER

Is the point diameter of tap correct for the size of hole being tapped? Does the tap enter the hole an excessive number of threads before taking hold, thereby losing the full benefit of the entire chamfered portion?

Is the chamfer the correct length?

Is the chamfer chipped or dull and in need of re-grinding?

Is the chamfer relief too great or not sufficient?

This is one of a series of advertisements published by Greenfield Tap & Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known



GREENFIELD TAP AND DIE CORPORATION

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DETROIT PLANT: 2102 WEST FORT ST.

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TAPS - DIES - GAGES - TWIST DRILLS - REAMERS - SCREW PLATES - PIPE TOOLS

board and 25,000 tons of boilers, shafts, propellers and other equipment for ship building. An additional 30,000 tons of materials required for ocean freighters was reported. One mid-western hauler reports carrying 400,000 lb. of building materials daily. Another is hauling 9000 tons of structural steel direct from the mill to the site of erection in the Mid-West.

A large volume of today's "precious" metals are moving by truck. In the first six months of the year a trucker serving Dow Chemical Co. at Midland, Mich. (largest sup-

ment of Nash-Kelvinator activity at Lansing, the corporation has signed a second agreement with the Defense Plant Corp. providing for \$15,150,744 for plant and equipment to make aircraft parts in the Reo plant at Lansing. The previous commitment was for \$8,433,860. Nash-Kelvinator will make aircraft engine parts and propeller assemblies.

Ford Motor Co. has opened a new school unit for apprentice training in the aircraft industry and now has accommodations for 10,000 student mechanics. The ex-

The new aircraft division school occupies the entire front portion of Ford's new Pratt & Whitney engine plant.

Of interest to other industrial plants is the announcement by F. E. Searle, head of the Ford schools, that the company will help others planning similar programs. "Of course, we can't hope to meet all such requests but we are lending a hand wherever schools similar to the Ford system are being organized."

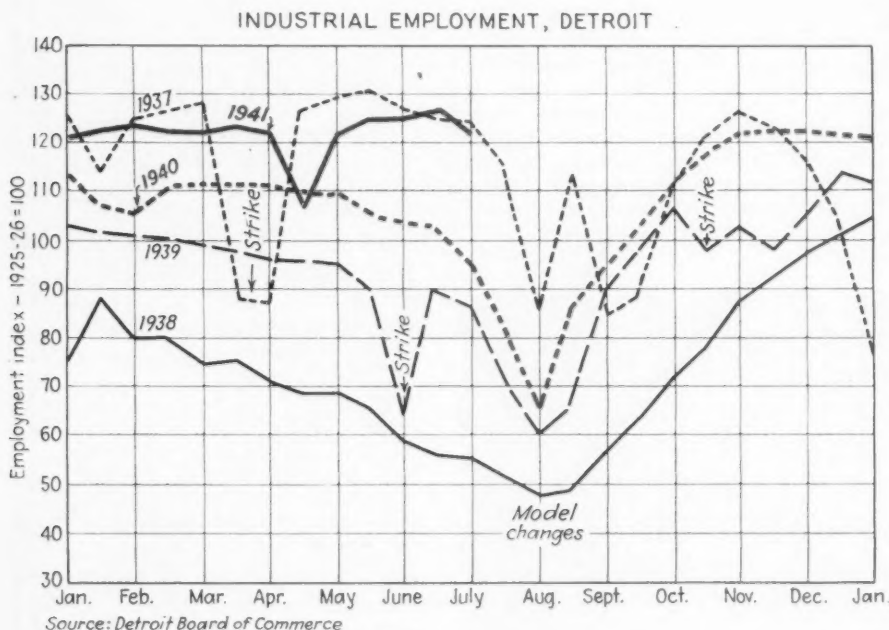
Production Has Seasonal Decline

A slackening of production of commercial products in Detroit, as industry changes over to produce defense material, brings anticipation of lower industrial employment for the remainder of the summer months, according to the Detroit Board of Commerce. During the first half of June, the period when the trend of employment usually is downward, factory employment rose sharply and neared an all-time peak, touching 126.7 on June 15. At that time 432,000 workers were employed in factories here, a number exceeded previously only during February, April and May of 1937, when factories were making up for time lost during strikes earlier in the year. Now automobile production has entered its seasonal decline, shortage of materials is contributing to lower production output and the shift to defense is taking machines and plant space from their normal applications. It is during the switch-over period that the serious unemployment is anticipated. As of June 30 the employment index was 119.6.

Automobile production rebounded after the July 4 holiday to 114,318 cars and trucks from 96,457 in the previous week, according to Ward's Reports, Inc.

Chrysler Plants Closed

The lower automobile production is partly attributable to the seasonal slackening in output as plants have begun to close for model changeovers and partly to the closing of three plants of Chrysler Corp. because of a shortage of material caused by a strike at National Automotive Fibres, Inc., which manufactures upholstery material. The strike at the fibres plant which was called in violation of a union agreement which extends to Aug. 1 has been settled early this week.



plier of magnesium in the United States) carried 3,000,000 lb. of freight for Dow. Another, handling 50 per cent defense freight, averages 100 to 150 lb. of magnesium per day in incidental shipments.

Airplanes Shipped By Trailer

Large numbers of completed airplanes are being hauled by trailer from factories. In the first six months of the year a truck operator at Mineola, N. Y., hauled 117 Republic airplanes for the U. S. Army, 262 Brewster planes for the British Purchasing Commission, 138 Grummans for the British and 70 Republic planes for the Swedish government.

Following last week's announce-

tensive school system, comparable in size to a large university, is expected to go a long way in solving Ford's need for skilled man-power in defense production. The aircraft apprentice school will have capacity for 3000 students and is the second largest unit in the Ford industrial school system. Largest is the regular Apprentice School in which youths beyond high school age receive trade training. It has 4000 students. Oldest of the units is the Henry Ford Trade School, founded in 1916, which now enrolls 1800 boys of high school age. Also within the Rouge plant is the U. S. Navy Service School to train 4500 Naval recruits per year, accommodating about 1200 at a time.

The "Inside Story" of OILGEAR *Fluid Power*

More and more leading machine builders are examining their designs closely with an eye to adopting Oilgear Fluid Power. For they recognize in Oilgear's simple, compact, efficient design, the years of research, the unique developments, the precision construction, and the thoroughly sound engineering that have made Oilgear the leader in the hydraulic field.

The new simplified construction of Oilgear Pumps and Motors brings about an important reduction in size . . . gives you more power in less space. It has been carried "all the way through" and results in fewer moving parts, less maintenance, exceptional speed control, and trouble-free operation. High efficiencies are gained by automatic pressure lubrication, large built-in unobstructed oil passages, anti-friction bearing mountings for moving parts, and smaller and lighter pistons. Oilgear Pumps and Motors may be used with any kind of drive—coupling, belts, chain, or gear—and integrally mounted. Output may be smoothly, steplessly varied from zero to maximum to fit exacting variable speed installations.

There's the "inside story" of Oilgear Pumps and Motors . . . facts . . . which add up to *efficiency, durability, ease of control, and flexibility* . . . the kind of performance you need for today's machines. But get the *complete* "inside story" of what Oilgear Fluid Power Equipment means to the performance of your machines. Use the coupon below immediately. THE OILGEAR COMPANY, 1309 W. Bruce Street, Milwaukee, Wis.



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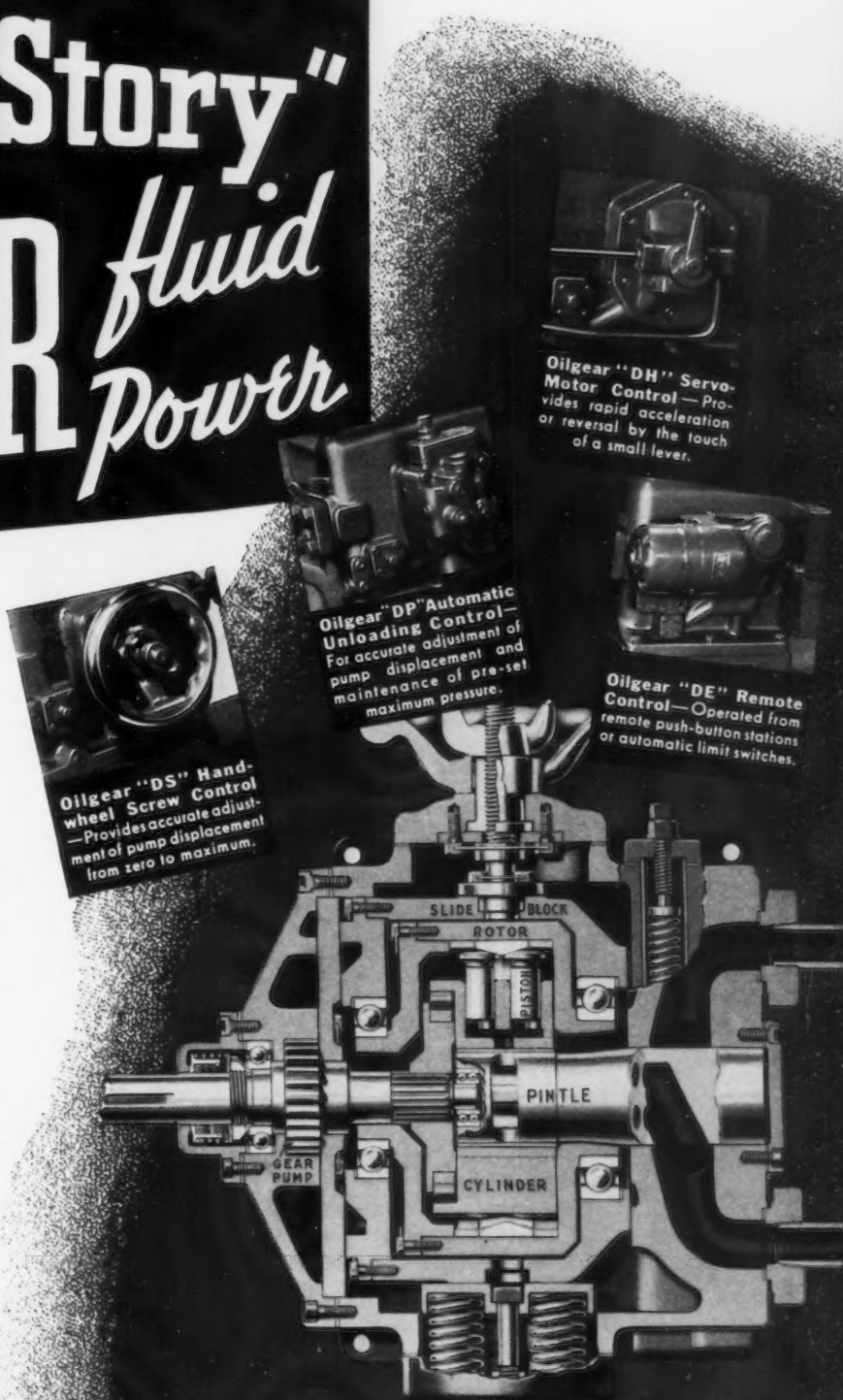
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fluid power



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—Provides accurate adjustment of pump displacement from zero to maximum.

Oilgear "DP" Automatic Unloading Control
—For accurate adjustment of pump displacement and maintenance of pre-set maximum pressure.

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Oilgear Variable Displacement Unit

Rotor and cylinder rotate with shaft. Displacement varied by changing position of slide block. Permits oil delivery to be varied smoothly over a stepless range in either direction from zero to maximum.

There's a wide selection of accurate direct and remote controls available for each size of unit to meet the requirements of your specific applications.

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WASHINGTON — Shortages of all sorts, particularly of metals, have been elaborated on at some length by Robert E. McConnell, OPM Conservation Unit chief. He has served notice that "the people of the United States might just as well face the simple fact that this defense program is going to mean that they will have few of the luxuries, comforts and conveniences to which they have become accustomed." Production and consumer goods, he pointed out, are bound to be curtailed in an increasing extent, including aluminum pots and pans, copperware, all nickelplated stuff, brass and so forth. Even the zipper industry may feel a squeeze.

"The steel shortage being on the order of 5 to 10 per cent now, certainly we aren't going to make much headway on zippers," said Mr. McConnell. He proceeded to express doubt that the zipper people would be able to get new facilities to increase their capacity. In a tabulation fixing the ratios of apparent civilian demands of "shortage" products to the remainder of supply after Army and Navy defense requirements are filled, steel is given an overall rating of 10 to 9—that is there is a civilian demand for 10 tons while only nine tons is available. On plates, "etc." the rating is three to two. That's not as serious as some others in the government paint the picture. It would indicate that the trim and convenient zipper will survive the emergency without suffering any great tightness, seeing that, in the absence of actual figures, it is not assumed that they represent a whole lot of steel tonnage.

By far the outstanding shortage is in aluminum, virgin and scrap. The civilian demand for this product as related to supply is given the broad ratio of 15 to one. Ratios for some other critical items are: copper, five to two; nickel, alloy steels, and manganese, three to two, and lead one to one-minus.

Speaking of copper, Mr. McConnell said that the United States has a production capacity of about 1,050,000 tons and imports all of the production of South America which is 500,000 tons, making a total available supply of new copper each year of 1,550,000 tons. Army and Navy requirements in copper were placed at 1,250,000 tons, leaving about 300,000 tons for civilian use as compared with a normal demand of around 800,000 to 900,000 tons.

Pinch Reflected in Homes

Because steel and non-ferrous metals are to be diverted to defense use in increasing quantities, the pinch in shortages is going to be reflected in the home.

Washington

BY L.W. MOFFETT
Washington Editor

• OPM Conservation Chief sees only 9 tons of civilian steel available for each 10 tons demanded after defense requirements are filled...Shortage ratio in civilian aluminum given as 15 to 1 . . . Consumer goods to meet increasing curtailment.

American housewives are going to have to get along with their old automobiles, vacuum cleaners, radios and the like. If the repairmen run short of materials—and it seems that Washington is emphasizing a shortage of everything—the housewife may have to walk, use the broom, and black out air entertainment "and the like."

Mr. McConnell said that in order to overcome these deficiencies the first job is conservation and the rich as well as the poor will have to hold down their purchases of strategic materials. The OPM policy of shutting off of non-essential civilian demand, whatever "non-essential" may mean, gives growing evidence of running counter to the expanded civilian purchase program that OPACS has in mind and

it may well be that the housewife will find a powerful friend in Leon Henderson and thereby not have to undergo some of the deprivations that are pictured by OPM. The two agencies as it is well known often do not see eye to eye.

Differences in policy of the two agencies may be seen in the suggestion of Mr. McConnell that the length of time that zinc remains on the mandatory priority list can be learned if Mr. McConnell is told how long zinc remains at 7½c. or whether it is possible to get up to 9c.

Sharing the widespread industry view and reflecting the policy of the old War Industries Board, Mr. McConnell said he thought that "if we raise the price of zinc it should be established at 9c. and we'd get some production which would take us over the hump."

"Do you think there is a chance of that?" asked a doubtful correspondent, who is aware of the extreme reluctance of Mr. Henderson to loosen the plaster of price ceilings.

"That is Mr. Henderson's orbit, not mine," responded Mr. McConnell, who also perhaps has his doubts.

The Democracies Slept

But the problem is much more fundamental than these remarks would indicate and it is inevitable that it will have to be worked out soon. For there is also a shortage of solutions to the many, many shortages of materials of which so much is heard.

Mr. McConnell himself stated very concisely the reason for these shortages. This country, like England and France, slept while Hitler loaded his arsenal to the roof, without protest or restraint from any source. The result is that an effort is being made to do in a few years what the fanatical Hitler has been

Step up **P-Q**^{*} to RATED CAPACITY-PLUS



with **SUNOCO** EMULSIFYING CUTTING OIL

Rough turning 5" diameter shaft on a
Monarch 20" model M engine lathe.
Courtesy of Monarch Machine Tool Co.

With the order of "all-out production" from rough cut to finish grind . . . you need perfect coordination between operator . . . machine tool . . . and cutting lubricant to get the highest P-Q* throughout your plant.

And that's exactly why leading machine tool builders choose, use and recommend SUNOCO Emulsifying Cutting Oil to keep their machine tools operating at rated capacity-plus. SUNOCO's high lubricating and heat absorbing qualities protect tools from seizing, burning and chipping. . . . Make possible prolonged tool life . . . stepped-up operator's productive time . . . and machine tool performance at rated capacity-plus. SUNOCO helps maintain a higher P-Q* —Production Quota.

Give "priority" to production in your plant . . . let Sunoco help step-up the P-Q of your machine tools and put performance on a rated capacity-plus basis.

SUN OIL COMPANY • PHILADELPHIA

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PETROLEUM PRODUCTS FOR ALL INDUSTRIES

doing since he became Chancellor of Germany in January, 1933.

Here's the way Mr. McConnell stated the case:

"You are going to hear a lot of complaints about shortages. I think there is one very broad idea to keep in mind and that is that it took Hitler seven years to get ready for this show; we are going to be ready in two years and, I think, England is going to give us that two years of borrowed time to get ready. But, to do that we have got to have the cooperation, not only of industry, but of the people. The public has got to know the reason why these things have got to be done, and to cooperate to get them done."

U. S. To Go To Court On Ordnance Sites

Washington

••• Department of Justice officials have been directed to institute condemnation proceedings to acquire immediate possession of four sites, recently announced, for new United States Army Ordnance projects. They are: Montana-

Parsons Ordnance plant, Parsons, Kan.; Louisiana Ordnance plant, Minden, La.; Southwestern proving ground, Hope, Ark.; Texarkana or Lone Star Ordnance plant, Texarkana, Texas.

The demand for immediate possession will be based on the existence of a national emergency and the necessity for starting work on these plants at once in the interest of national defense. The \$35,000,000 Montana-Parsons, the \$29,000,000 Louisiana and the \$45,000,000 Texarkana or Lone Star Ordnance plants will be shell-loading plants, while the \$15,000,000 Southwestern proving ground at Arkansas, as its name implies, will be a testing ground for ammunition, similar in character to the Jefferson proving ground at Madison, Ind.

The area involved in the condemnation proceedings amounts to 102,448 acres, of which 16,000 acres comprise the Montana-Parsons site, 43,468 acres constitute the proving ground in Arkansas, 15,500 are contained in the site for the Louisiana ordnance plant, and approximately 25,480 make up the site for the Texarkana plant.

Price Ceiling Relief Given W. Ames & Co.

Washington

••• W. Ames & Co., Jersey City warehouse and jobbing mill, has been given permission by OPACS to sell bars, angles and spikes at prices of \$2.85, \$3.10 and \$3.45 per 100 lb. respectively. These prices represent increases of from 36c to 45c per 100 lb. above ceilings fixed by OPACS on equivalent products.

The price agency cited the exemption as an indication of its policy of giving relief in special situations where ceiling prices cause hardship, explaining that the applicant sells the greater part of its products in small lots on a warehouse basis without use of the basing point system.

Another 14,000 acres, west of the Texarkana plant, will be acquired later for a munitions depot.

Vessels Available for Steel Shipped to Pacific Coast

••• Decision by the Maritime Commission to retain sufficient vessels in the intercoastal service is looked upon by Price Administrator Leon Henderson as an assurance of reasonable transportation rates on iron and steel products moving from Atlantic seaboard mills to the Pacific Coast.

The OPACS administrator, whose job forces him to take note of all cost factors bearing on commodity prices, called the Maritime Commission's statement "unusually important." The commission's statement said that "enough vessels will be retained in the intercoastal service to assure continuation of important movements of commodities requiring water transportation between the Atlantic and Pacific seabords," but qualified its announcement with the assertion that the retention could be barred only by "conditions much more serious than now anticipated."

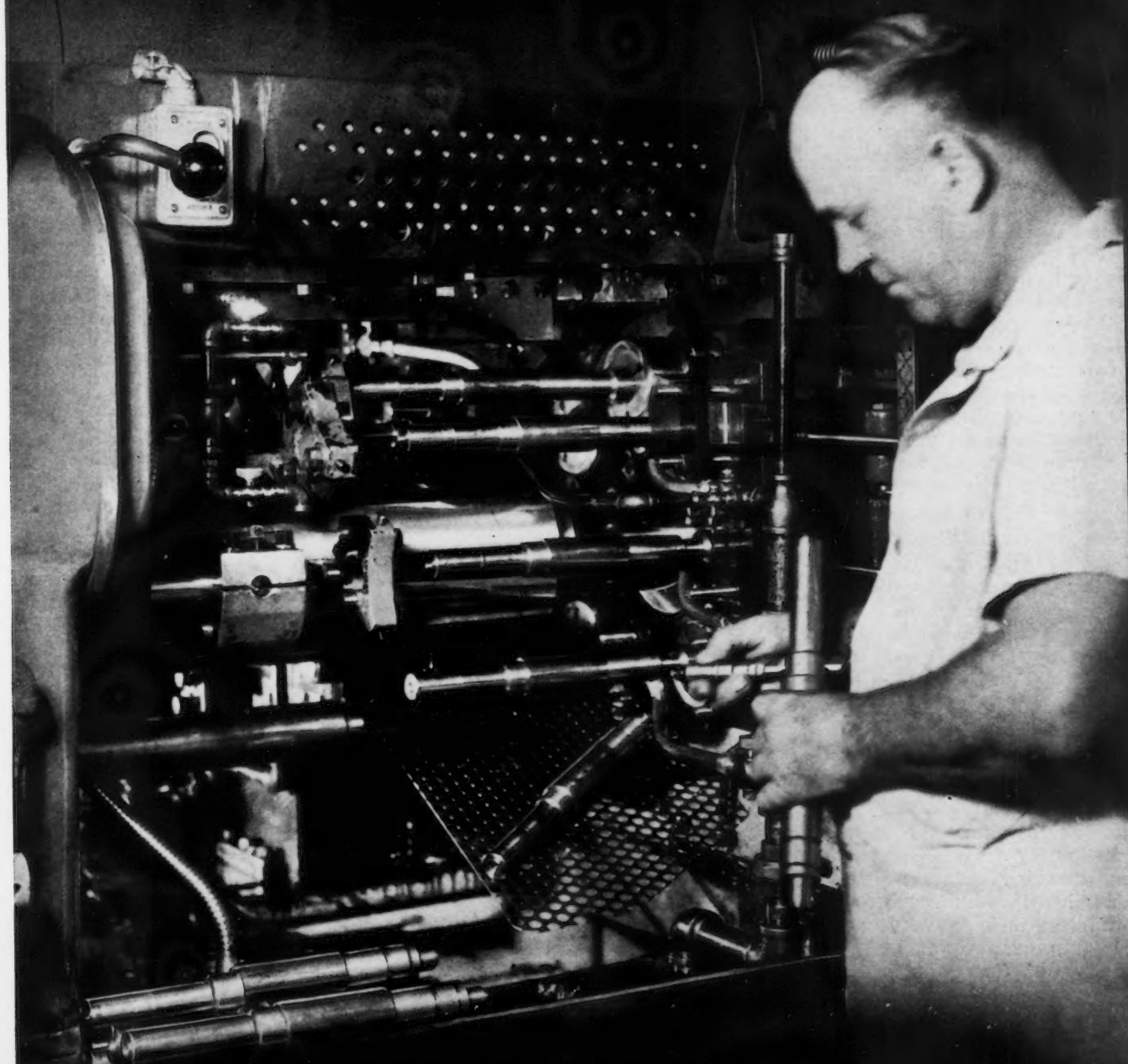
The commission observed that necessary withdrawals of tonnage will be made in as orderly a manner as possible so as to avoid throwing any sudden or unreasonable loads upon rail carriers.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



SHAFTS FOR SPEED SPEED FOR SHAFTS

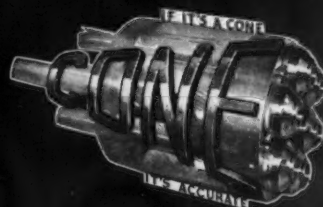


Transmission Shafts have changed since the horse-and-buggy days. Today, as the motor car yearly attains new heights in efficient, dependable transportation, shafts are built for safety, speed and endurance over thousands of miles of travel.

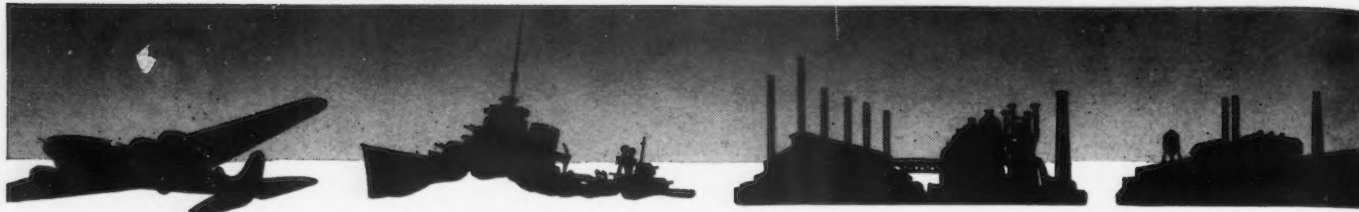
Improved production methods permit better quality cars at lower cost. More quality per shaft per dollar means more trouble-free miles per dollar—more automobile per dollar. This is why so many Transmission Shafts are now rough- and finish-turned in one operation on Conomatics.

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CONE AUTOMATIC MACHINE CO. INC. WINDSOR, VT.



ON THE WEST COAST



SAN FRANCISCO—Among the growing pains incident to the war emergency and to the birth of new industries on the Pacific Coast, the sorest aches are developing from transportation problems, so far as iron, steel and metal users are concerned.

Over the years, since the opening of the Panama Canal, traffic habits as well as price and rate structures have been founded on ocean-born intercoastal commerce. In normal times, way back in 1939, approximately 150 vessels were available to carry cargo East and West. Each would carry from 4000 to 8000 tons depending on the cargo and although the journey consumed only from 21 to 24 days at sea, a round trip was more likely to be 75 to 80 days.

Since the post NRA days and the basing point pricing for steel products, prices on the Pacific Coast were arrived at on the basis of the Sparrows Point basing point plus a 55c. water rate to Pacific Coast terminal ports. The 30c. rail rate from Pittsburgh to seaboard was usually absorbed, and Pacific Coast mills quoted at Sparrows Point base plus 55c.

In these emergency days, for major shipbuilding and aircraft production, for immense Naval and Army developments, and for the other industries and activities that follow close in the wake, cargoes and requirements have greatly increased. But the available intercoastal vessels have now been reduced to approximately 30 per cent of the former number and they are still diminishing. Although last week newspapers cheerfully reported that intercoastal operators "were assured by the Maritime Commission that enough vessels will be retained in intercoastal service to assure an adequate flow of commodities between Atlantic and Pacific ports," nevertheless conditions and recent history are contrary notwithstanding.

Great is the pressure on price

• Ships scarce for carrying materials on west coast . . . OPACS pressed for transportation rate equalization . . . Four magnesium and aluminum plants to be built . . . Restaurant owners strike for union bargaining.

control Administrator Leon Henderson. The all-rail freight to the Coast from Sparrows Point for ship plates, for instance, is \$1.43, an increase of 88c. per hundred pounds over the old water rate. Since mid-April and as a result of an act of the last Congress, the former land grant concessions on government rail shipments are now confined strictly to military supplies. Ship plates for destroyers command the land grant rates, a reduction of from 40 to 50 per cent, which is absorbed by the railroads, incidentally. But ship plates for commercial carriers now take the regular rail rate, even though financed or directly contracted by the Maritime Commission.

Temporarily there is a great incentive for production on the Pacific Coast from native raw materials and such encouragement for a balanced and self-sufficient economy as has never existed before.

Blanket Rate on Steel Asked

Far western traffic officials have been keenly interested in recent hearings at Chicago before the Interstate Commerce Commission wherein steel producers joined with OPM and other government emergency officials in requesting a blanket rate on iron and steel products all-rail of 90c., applying from Chicago, Pittsburgh or eastern seaboard. Present all-rail rates are

\$1.43 from Sparrows Point, \$1.27 from Pittsburgh, and \$1.10 from Chicago. The request for a blanket reduced rate was denied, but the pressure still exists.

Instead of two or three boats per week, as formerly, with steel cargoes of 5000 tons, now the major steel producers get a boat a month and a few hundred tons per vessel. So rail rates from now on will determine Pacific Coast prices and rail tolerances and limitations must define the unit size of shipment. Unless, of course, the Maritime Commission can find these vessels so glibly "assured."

So swift have been developments and so great the impetus and acceleration that steel producing plant capacity on the Pacific Coast seems dwarfed and insignificant whereas eight years ago it seemed extravagant and uneconomical. If no more orders were received, the foundry of the Columbia Steel Co., U. S. Steel Corp. subsidiary at Pittsburg, Calif., could operate continuously for the next year on its present backlog. Similar pressures have come on sheet and plate mills, even though demand for wire products is not uncomfortably crowded.

Because available electric power in quantity may be of crucial importance next year and for future developments and the long pull, and because the Bonneville Power Administration of the Department of the Interior controls such a great amount of future power in the Pacific Northwest, announcements and commitments from that source should be carefully studied, indicating the future trends and moves on the chess board whereon is now being worked out the industrial battle of the future so far as the Pacific Coast is concerned.

Huge Power Expenditure Approved

Administrator Paul J. Raver has approved the expenditure of more than \$7,200,000 for two new power substations, additions to four others and two 115kv. transmission lines. One is a terminal substation on

MAKING AMERICA SAFE

... *with* Precision Machine Tools

SUCCESS of the vast effort to attain national security is based directly on how swiftly manufacturers can produce . . . produce without any sacrifice of those standards of accuracy that have made mass production of interchangeable metal parts a distinct American accomplishment. *Ex-Cell-O's place in the great emergency is obvious.* As one of the nation's leading builders of machine tools, its high-precision products have for years contributed to the increasing of metal working efficiency . . . today, practically every branch of modern industry depends upon them when accuracy, speed, economy are the requirements. The same superior skill and experience that made these Ex-Cell-O achievements possible in the past . . . that have made Ex-Cell-O a common word for precision wherever machine tools are used . . . are willingly pledged to the great task now placed upon them—to serve American industry to the ultimate degree of human power in the supreme job of protecting America.

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Precision THREAD GRINDING, BORING AND LAPPING
MACHINES, TOOL GRINDERS, HYDRAULIC POWER UNITS, GRIND-
ING SPINDLES, BROACHES, CUTTING TOOLS, DRILL JIG BUSHINGS

Puget Sound from the Grand Coulee plant and the others are in the vicinity of Vancouver and Longview, on the north bank of the Columbia River downstream from Bonneville, where the new industrial plants are being located to take advantage of power immediately available.

Concurrent with the announcement of these allocations under the Congressional appropriation of \$22,858,500 for fiscal 1942, Administrator Raver is also "completing arrangements" for four large "defense" plants to produce aluminum and magnesium with total power requirements estimated at more than 200,000 kw. At Spokane will be a 60,000,000 lb., aluminum reduction plant and a 24,000,000 lb. magnesium plant. At Cascade Locks will be a 100,000,000 lb. aluminum reduction plant, and at Tacoma a 30,000,000 lb. reduction plant, according to present plans. The location of these four new plants in the Pacific Northwest, which seems to be fairly certain, will increase the Bonneville administration commitments to a total of 495,000 kw. Present combined generating capacity of Bonneville and Grand Coulee is 214,400 kw., but by late summer with new installations completed the total will have risen to 356,400 kw. By the beginning of next year, the prospective capacity is 518,400 kw., and by May, 1942, installations at the two dams will produce a total of 626,400 kw. Therefore, there are over 125,000 kw., still to sell. But the bidding now seems to be brisk and it is probable that other daring swimmers will dash into this wave of the future in the hope that they might secure government loans for this gamble on a magnificent scale with huge prospective government generated power.

Restaurant Owners Want Union

A peculiar new labor development closed 49 San Francisco "name restaurants," called an "enforced walk-out," by the strikers. Reversing the usual situation, the restaurant operators were seeking an opportunity to bargain collectively with their employees over wages and working conditions. The union has granted such a master contract to hotels, to tea rooms, and to dairy lunches, but would not meet with the restaurant

operators comprising the major employment factor. So restaurants announced a 25 per cent wage reduction, and at the end of the week when the checks for 75c. on the dollar were received by the employees, they naturally walked out. There was no picketing and no attempt to continue operations. Operators announced that former wages would be resumed as soon as the union representatives would confer and bargain collectively over a master contract. And the public waited in line for lunch.

Tacoma shipyards have gone on a six-day week to speed production on five C-1 type freighters and 42 C-3 and tanker types.

Unemployment Insurance Claims Drop 55%

California's State Department of Employment announces a 55 per cent decrease in the number of claims for unemployment insurance compared with the same week a year ago. At the same time the

State Chamber of Commerce announces that California shipbuilders will need an additional 44,000 skilled and semi-skilled workers by the end of November on the basis of present contracts. This is more than double the number now available, even with semi-skilled or preliminary training.

Coast Construction Totals \$102,500,000

Heavy construction contracts totaled \$102,500,000 west of the Rocky Mountains for June, including \$73,000,000 for the three Pacific Coast states. This was three times the value of contracts for June of last year.

Of major importance in the Pacific Northwest was the \$3,524,955 award to the West Construction Co. of Southboro, Mass., for construction of 11.2 miles of roadbed for the Alaskan railroad including two tunnels. Another \$3,000,000 contract for the Hermiston, Ore., ordnance depot has been awarded.



SPOT WELDER AT LOCKHEED: Spot welding is taking the place of riveting wherever possible on unstressed parts at the Lockheed Aircraft factory in Burbank, Cal., where mass production of Lockheed P-38 interceptors for the Army Air Forces and Hudson bombers for the RAF goes on 24 hr. a day.

McKAY

ELECTRIC WELD TUBE MILLS

McKay Tube Mills—built in a complete size range—all possess certain characteristic design features which have proven of definite value under actual production conditions. We list a few of the outstanding features:

SINGLE UNIT CONSTRUCTION: Forming Units—Welder—Flash Trimmer—Sizing and Straightening Units and Cutoff are mounted on a one piece welded bed plate, heavily reinforced—with the accurate alignment shoulders required—permanently machined onto the top surface. This makes the machine an entirely self-contained unit, with none of the field alignment problems which occur where separate units are used.

McKAY FORMING ROLL DESIGN: Maintains accurate seam alignment, necessary for good seam weld. It also produces a smooth tube, with size maintained closer than commercial tolerance requirements.

CENTRALIZED CONTROLS: Heat, speed and pressure controls placed for maximum convenience of operator.

ROTARY TRANSFORMER TYPE RESISTANCE WELDER: McKay-AmerTrans. construction gives 92% to 95% power factor—efficiency at welding point 90 to 95%—accurate heat regulation—maximum accessibility of electrode rolls without disturbing transformer or bearings.

CUTOFF: High speed rotary head or rotary saw available, to suit requirements.

QUICK CHANGE-OVER: Actual production conditions prove that a complete change-over from one size tube to another can be made in less than three hours by regular operator and helper. This is because McKay construction includes enough auxiliary equipment so that units may be interchanged without disturbing vital settings.

McKAY "McKROMETER" ROLL PRESSURE ADJUSTMENT: (Covered by U. S. Patent 2,122,615.)

Allows actual recording of correct pressure settings at each pass for each diameter and gauge tube.

FLOOR SPACE REQUIREMENTS: Single unit construction cuts floor space requirements in half. Machine illustrated will make up to 1½" tube—space required 21' 0" by 6' 0"

The above represents only a few of the advantages of McKay equipment. Call on us for complete information, samples and demonstration.



THE McKAY MACHINE CO.

Engineers and Manufacturers of
SHEET, TIN AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO

Fatigue Cracks

BY A.H.DIX

Chips Reveal New Art Form

• • • The photographs of typical chips from automatic screw machines, in Norman E. Woldman's recent article, "Relations Between Microstructure and Machinability," show that the chips assume amazingly lifelike forms. None of the following has been doctored up. Each is exactly as it appeared on page 47 of the June 26 issue, without, of course, the interpretive notes:



A thin, alarmed duck removing her offspring from the vicinity of a boa constrictor.



An old lady in a sheath skirt, with boxing gloves, and being posteriorly attacked by a pugdog.



Popeye riding a broom, wearing a tam o'shanter and inhaling a bunch of spinach.



A trained animal act. Horse being ridden by small lion.



A duck balancing Balboa on its beak while he gets his first view of the Pacific.



A full-skirted, masked lady diver just after leaving the springboard in the first movement of a swan dive.

These are some of the less imaginative interpretations of SAE 3250, 4350, and 6150 chips. You could doubtless do far better in an uninhibited moment.

Sea-Going Hearth Protectors

We see by the papers that Brooks Brothers are advertising, for \$6.50, an overseas cap for home guards.

Smoky City Fable

• • • In our grab bag we have been carrying for some little time a story sent in by Tom Campbell, your legman in Western Pennsylvania. We had hoped to tie it up to an item about those who confuse cause and effect and who wish to enjoy the effect without troubling to create the cause. But the item has not presented itself and before the story goes cold on our hands we give it to you:

Two men of low I. Q. were out walking one day, when a duck flew overhead. One of them raised his shotgun and the duck fell to earth with a thud. The other said, "Why did you waste a shell? The fall would have killed him."

Flyspeck Finder

• • • By Monday we shall receive a note from the anonymous, pedantic "Deac," telling us that the last sentence above should read, "The fall would have killed HER," inasmuch as ducks are feminine, but we will let it ride anyway, as *drake* sounds a little strained, and no one goes *drake* hunting anyway.

Each week we get a note from "Deac," carefully pointing out the grammatical flyspecks in your favorite family journal. In his latest note he sneers at this:

"In drawing the carbonator shell, annealing is required between each operation."

The bold face is his. Obviously you don't anneal *between* a draw, but between *draws*. However, the meaning is clear, and "Deac" is probably the only one of our 92,399 readers who didn't take the sentence in his stride.

This, too, is a target for his venom:

"Spinning can be done on an outside diameter, in which case both the outside and inside diameters are usually decreased, or on an outside diameter, in which the latter as well as the outside diameter is increased."

"Gee," he wisecracks, "am I disappointed! I thought maybe someone had at last discovered the secret of how to make a tank larger on the inside without increasing its outside measurements." It is no secret. It can be done by thinning the wall.

We are not thin-skinned and we cry for criticism from kind friends. At the same time we wish to point out that whereas Thomas Gray could spend days dawdling over his Underwood balancing a single line for his deathless "Elegy," we have to get out a 60,000-word issue every week. If in the interest of timeliness a few syntactical sins are committed we can view them without sorrowing overmuch. We weep only when confronted with errors of fact.

Mike-Handling Soapboxers

• • • New Jersey seems to abound in toolmakers who are not merely content with asking for a job but want to sermonize while doing so. We are indebted to E. Echikson, president of the Pioneer Tool Co., Bloomfield, N. J., for this second case of a toolmaker using the Situations Wanted columns of the *Newark Evening News* as a soapbox:

TOOLMAKER—Have 25 years' experience in all-around finer tool and experimental work; member of International Association of Machinists, desiring connection with an employer paying above \$1.45 per hour; must be intelligent and man enough to realize and understand that at present it is the employer that needs the toolmaker more than the toolmaker needs employer; for example, it is easier for toolmakers to get truck-driving or salesmen's jobs than for employer to hire salesmen or drivers for toolmaking; only those meeting above qualifications and able to furnish good references need apply. Address S. E. C., Box 280, News office.

Puzzles

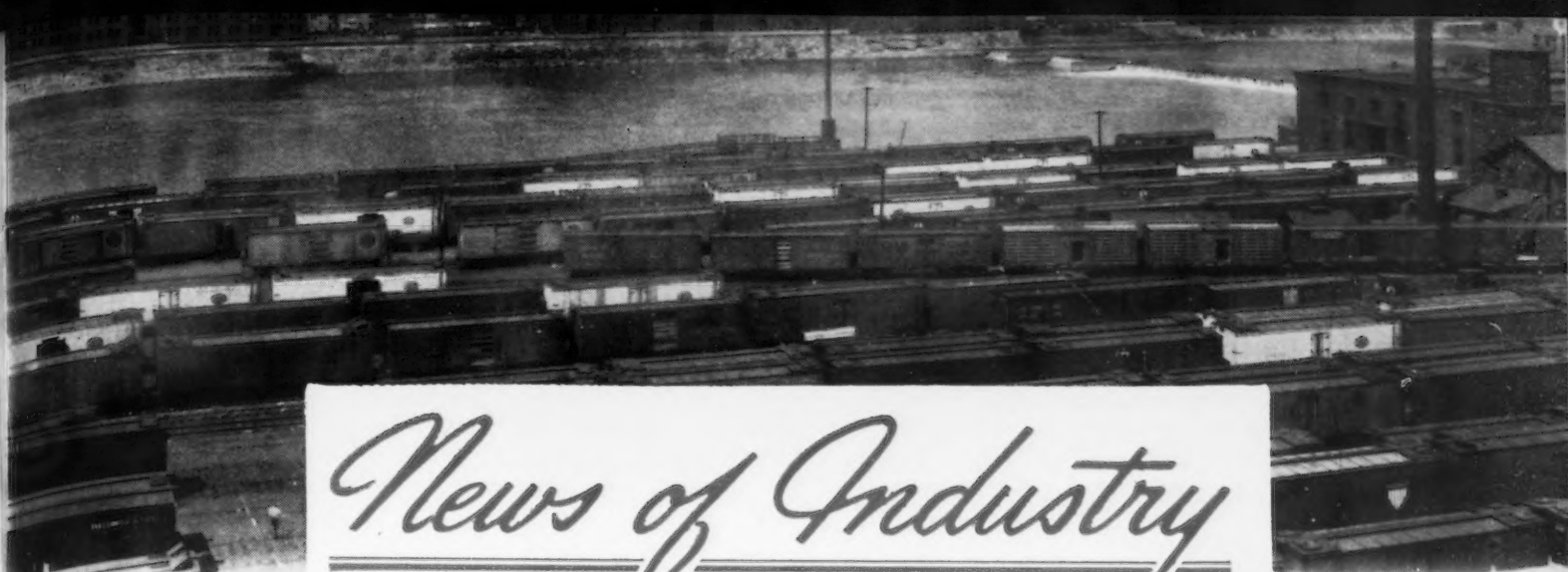
Last week's farmer started off with 15,621 potatoes. Two additional correct solutions of the June 26 problem, requiring that a value for $\frac{1}{8}$ th be expressed by using each of the nine digits, have come in from W. C. Marshall (9156/73428) and Mrs. Lena R. Ziegler (6789/54312).

This headache is from Lt. Commander A. R. Simpson: General Bienne of Graustark has 100 military units under his command. There are three garrison towns in Graustark, bearing the names of Day, Night, and Morrow. On July 1 the General's units were distributed among the three towns. At 8 A.M. that day (0800, military time) he broadcast this order, "UNITS NOW AT DAY WILL PROCEED TO NIGHT TO MORROW STOP UNITS NOW AT MORROW WILL PROCEED TO DAY TO NIGHT STOP UNITS NOW AT NIGHT WILL PROCEED TO MORROW TO DAY."

At 6 P.M. (1800) he broadcast, "ORDERS GIVEN THIS MORNING FOR UNITS TO PROCEED TO NIGHT ARE CANCELLED AS FAR AS UNITS WHICH HAVE NOT YET MOVED ARE CONCERNED." And at midnight (2359) he announced, "UNITS WHICH WENT TO DAY TO NIGHT WILL RETURN AT DAYBREAK TO MORROW."

The General's idea of "day" (considered as a time unit) is the period ending at 6 P.M. (1800). "Night" is the period between 6 P.M. and midnight.

On July 3 the distribution of the General's forces was: at Day, 26 units; at Night, 24 units; at Morrow, 50 units. Assuming that where an order appears to be capable of two interpretations, half the unit commanders to whom it might apply interpret it in one sense and half in the other, what was the distribution of the forces at 8 A.M. on July 1?



News of Industry

Freight Car Shops Run At Half

Capacity Despite A-3 Priority

By T. C. CAMPBELL

Pittsburgh

••• Granting of an A-3 priority by the OPM to the nation's freight car builders has by no means solved the serious transportation problem which may soon have an adverse effect upon the national defense program, THE IRON AGE has learned from informed sources.

Steel companies have so many priority ratings which come ahead of the symbol A-3 that unless some other method or outright allocation of freight car material among various steel companies is immediately resorted to, the tremendous backlog of freight cars now on order will hardly be dented, car builders and railroad people alike believe. Car builders and some steel people suggest that the freight car situation must have a complete airing and must be considered as a steel industry-wide problem before real action can be gained.

Although some relief has been afforded freight car builders on plate deliveries, such shipments as are being made now and even those scheduled for future delivery, will do little more than enable many car shops to operate at 40 or 50 per cent of capacity. Furthermore, the heavy pressure for defense items carrying higher priority ratings than freight car mate-

rial, might, at any time, cause cessation of plate shipments to freight car plants, thus causing a slow up or actual shutdown. Aside from this extreme difficulty, a bottleneck exists on structural shapes which constitute roughly about 30 per cent of freight car construction.

A composite picture of the freight car building situation discloses that while one or two plants are operating at close to capacity, by far the majority are only utilizing about 40 to 50 per cent of average capacity. This is entirely due to freight car builders' inability to obtain sufficient steel.

Of the 98,413 freight cars ordered during the first six months of this year, 31,086 were allocated to shops of various railroads. This leaves an allocation of 67,327 cars to various independent freight car builders.

The nation's freight car plants, excluding the railroads own shops, have a maximum yearly capacity

OCTOBER PEAK: A possible shortage of 200,000 freight cars is predicted for U. S. railroads by October when freight movement hits a peak. Some railroad officials see no shortage ahead. Almost 100,000 cars have been ordered since Jan. 1.

of approximately 150,000 cars, with some realists claiming that 100,000 cars a year would more nearly hit the mark. It is estimated by reliable sources that close to 47,000 of the odd 67,000 freight cars already ordered from independent car builders represent unfilled backlog.

With freight car shops (exclusive of car shops owned by railroads) operating at no more than 50 per cent, unless present operations are boosted immediately, it will take almost a year to complete current unfilled car orders, it is said. The situation is really worse than these figures indicate because the railroads' own car building shops are not receiving steel at any faster rate than independent car builders.

Meanwhile, railroads are frantically clamoring for delivery of freight cars they ordered some time ago. Although railroad officials deny that there will be a car shortage this year, reliable sources estimate that by mid-October when the traffic peak is reached the shortage may run as much as 200,000 cars or more. Freight car builders on the other hand are becoming panicky over their inability to cut down unfilled orders because they have hanging over them the definite probability that close to 300,000 freight cars will be demanded over the two-year period, 1942-43.

While the railroads, the OPM, the steel industry, and the car builders seem to recognize the gravity of the situation, nothing tangible toward breaking the jam in the flow of freight car material has been done, it is claimed by some car builders. Action may be forthcoming soon it is said.

Three car plants which had been

shut down for anywhere from six to eight weeks because of lack of steel, have resumed partial operation but such operation is precarious and depends to a large extent on whether additional material can be squeezed out from under higher priority business.

So far the freight car situation has not involved the allocation of orders among various steel companies such as occurred on the maritime business, but observers here believe that such a method will have to be used.

Unless some means is found whereby steel can be shipped to car builders in sufficient quantities to raise operations to maximum capacity, there is little use of discussing a 1942 or 1943 freight car building program.

Freight cars now on order with independent car builders and railroad freight car shops but not completed, approximate 70,000, all of which are urgently needed because of the national defense picture. A rough estimate would indicate that these cars will consume approximately 980,000 tons of steel including shapes, plates, bars, sheets and strip. It is also pointed out by railroads and car builders that in addition to new equipment almost 25 per cent as much steel is necessary for repairs to existing rolling stock. Latest figures indicate that approximately 40 per cent of the existing freight cars are 20 or more years old and the obsolescent rate is given by some officials as amounting to 60,000 to 65,000 cars a year.

An estimate on the allocation of freight cars ordered since the first of the year is as follows:

Builder	Total to Date Inc. June (6 Mos.)
American Car & Foundry Co.	15,744
General American Transportation Corp.	7,982
Bethlehem Steel Co.	6,294
Greenville Steel Car Co.	1,525
Mt. Vernon Car Mfg. Co.	6,029
Magor Car Corp.	620
Pacific Car & Foundry Co.	1,300
Pressed Steel Car Co.	6,438
Pullman Standard Car Mfg. Co.	19,471
Ralston Steel Car Co.	1,575
Railroad Companies' Own Shops	31,086
Virginia Bridge Co.	1,025
Other car shops	224
Total	98,413



DIRECTOR OF TRANSPORTATION: This is Dr. G. Lloyd Wilson, director of transportation in OPACS, where the freight car shortage in its relation to price is being watched.

Five Tankers, Cutters Being Built at Duluth

Duluth, Minn.

• • • Another coast guard cutter for the U. S. will be built here by Zenith Dredge Co. which holds defense contracts for three vessels amounting to \$2,279,229. Five ships are in process at the twin ports of Duluth and Superior, Wis. Included are a coast guard cutter built by Marine Iron & Shipbuilding Co., Duluth; and two navy oil tankers under construction.

Coming Events

- July 23 to 26—Silver Bay Industrial Conference, Silver Bay on Lake George, N. Y.
- Sept. 23 to 26—Iron and Steel Engineers, annual convention and exposition, Cleveland.
- Sept. 25 to 26—Society of Automotive Engineers, National Tractor Meeting, Milwaukee.
- Oct. 1 to 4—The Electrochemical Society, Fall Meeting, Chicago.
- Oct. 20 to 24—National Metal Congress, Philadelphia.

Brazilian Plant to Get Priority Rating

• • • Priority aid assuring Brazil's National Steel Co. of prompt shipment of steel, machinery and other equipment for the completion of its \$45,000,000 steel facilities within three years has been approved by the OPM, the State Department, OPACS, and the Army and Navy Munitions Board.

While it has been known for some time that priority arrangements would be made in the case of supplies needed for the project, an OPM announcement last week was the first confirmation to be made by a government agency. The OPM statement gave no details except to say that contracts and orders will be given priority ratings sufficiently high to secure adequate deliveries without delaying defense deliveries in this country.

Giving Brazil priority recognition for the steel expansion plan, it was said, is in accordance with the United States policy of assisting other American republics to obtain essential materials in this country so far as is compatible with defense requirements here.

The Brazilian project, for which the National Steel Co. has already broken ground, is being financed through a \$20,000,000 Export-Import Bank loan, the balance being supplied by the Brazilian Government and financial institutions in Brazil. The amount of the Export-Import Bank loan, under the terms of the agreement, is to be spent in this country through contracts with 300 different manufacturers and suppliers.

Service Medals Given To 69 U. S. Steel Workers

• • • Award of U. S. Steel Corp. service medals to 69 employees in recognition of long service during the second quarter of 1941 was announced this week by Robert Gregg, president of the Tennessee Coal, Iron & Railroad Co. Heading the list, in point of service, was John S. Tollett, machinist in the mills department of Ensley works. Mr. Tollett, who retired last month, received a 45-year medal.

OPM Plans Labor Advisory Groups; Shakeup Forecast

Washington

••• Responding to increasing clamor from labor for greater representation in the defense program, the OPM has approved plans to set up defense labor advisory committees whose members will be selected by OPM Director General Sidney Hillman.

At the same time, Mr. Hillman, in response to a Presidential request to assume full responsibility for getting necessary employees into defense plants, combined the labor supply work of 12 government defense units into a new labor supply branch within the OPM labor division.

Establishment of labor advisory committees, coming on the heels of an OPM reorganization under which commodity divisions and industrial advisory committees will be created, leaves only one additional step—the setting up of consumer advisory groups—to simulate the ill-fated NRA organization of Blue Eagle days. The latest development gives strength to persistent rumors that the current OPM reorganization is merely superficial and will subsequently take the form of a far more fundamental and drastic shake-up.

Just as the industry advisory committee will advise on matters of primary concern to industry and management, so the labor advisory committees will advise government representatives in the various OPM commodity sections on the aspects of defense production of primary concern to labor.

Section 2 of OPM regulation No. 8 gives Mr. Hillman this discretionary power in establishing the new committees:

"Whenever in the judgment of the director of the labor division . . . the interests of national defense will be served thereby, he shall invite the representatives of labor in an industry in which there is a commodity section in the Office of Production Management to nominate delegates to comprise the membership of a defense labor advisory committee. The director of the labor division

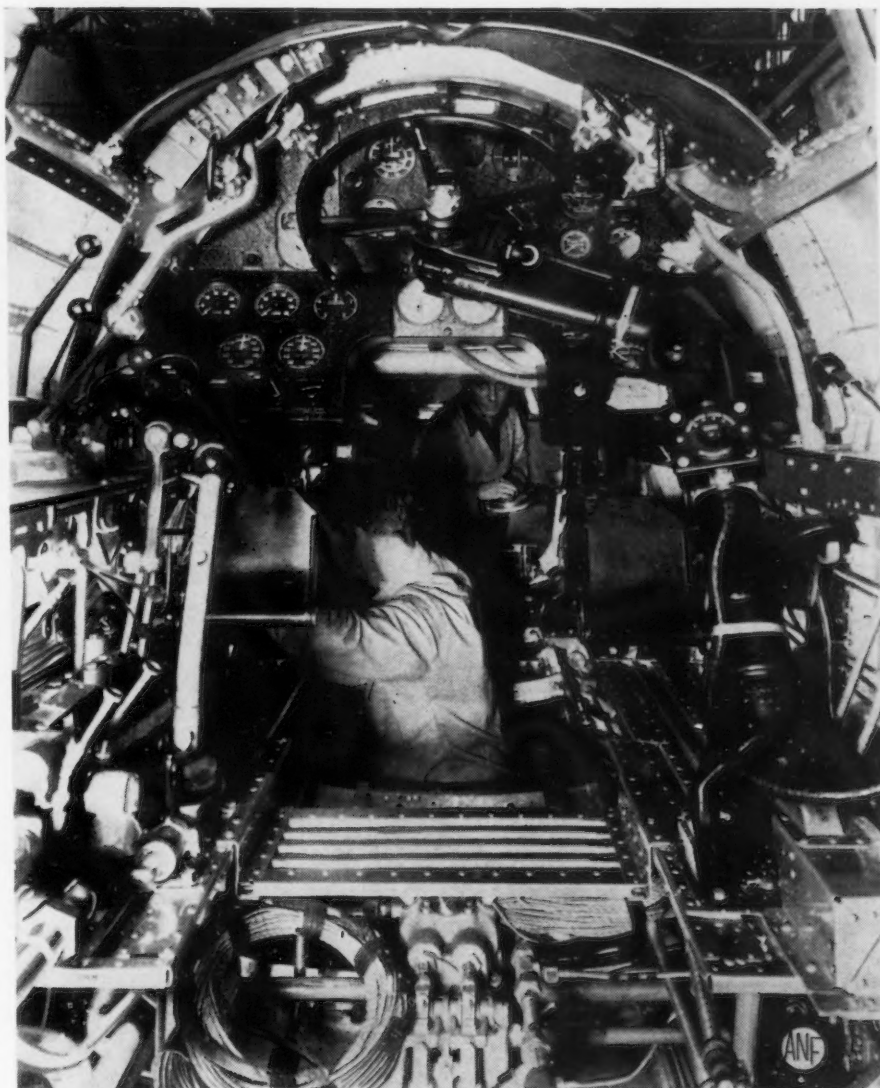


Photo by Harris & Ewing

GADGETS: In the minds of U. S. aeronautical instrument builders are scenes like this—the cockpit of an American bombing plane with the dozens of controls that spell flight security to pilot and crew. Building a bomber is not a simple task.

shall appoint the members of each defense labor advisory committee. He, or such officer of the division as may be approved by him, will act as a point of clearance for the committees and keep records of their membership."

Mr. Hillman called the new labor supply branch "the most significant pooling of labor, management and government resources" since the inception of the defense program. He outlined the procedure by which shortages of labor in key defense plants will be met, and appointed Arthur S. Flemming, who is in charge of the Civil Service Commission's defense recruiting activities, to head the new division.

Air Line Sends Used Propellers to England

St. Paul, Minn.

••• Hamilton constant speed propellers will be shipped to England for military use by Northwest Airlines, Inc. Formerly used on NWA's Lockheed Electra 10-A planes, which fly between the Twin Cities, Duluth, Winnipeg and Fargo, the blades will be cut down by the airline to an 8 ft. diameter instead of the present 9 ft. Propellers will probably be used on British pursuit planes. Resectioning work is being done in the airline's base here. NWA has already sent to England magnetos, pistons, radio receivers and other aircraft instruments.

London

British Can Export More Than 50% of Tinplate Stock

••• The British Tinplate Controller has granted manufacturers and merchants permission to export additional quantities of tin plate from stock. A previous order allowed shipments of 50 per cent of current holdings. In contrast to the earlier order, the new one makes no reference to the quantity likely to be involved. This, the trade feels, will depend on the number of licenses forthcoming.

Licenses to cover shipments of tinplate up to 4000 tons for Portugal, for sardine packing, are to be issued, with the United Kingdom Commercial Corp. handling the contract on behalf of the govern-

Armco Plant Sets New Output Record

••• American Rolling Mill Co. this week announced that three production records were set at its East Works plant. The Open Hearth Department's June production exceeded the previous record by 1363 tons; the blooming, bar and strip mill rolled 1500 more tons of steel than ever before; and the cold strip mill accelerated its output by 5 ft. per minute to a new high.

ment, at the prevailing export quotation of \$6.15 per box. Allocations based on exports from 1935 to 1938, have been made only to those concerns with Portuguese connections.

FLYING FISH: The U. S. S. Flying Fish, newest American submarine (below) was launched last week at Portsmouth, N. H., Navy Yard.

Photo by International



86—THE IRON AGE, July 17, 1941

1940 Imports of Plant Machinery Down 48%

••• Imports of industrial machinery into the United States in 1940 were valued at \$4,125,661, a 48 per cent decline from the 1939 total of \$7,893,152, the Department of Commerce reported last week. The most important factor in the trade was the large decrease in purchases from Germany, usually the principal supplier of this type of equipment, which dropped from \$3,639,354 in 1939 to only \$175,335 in 1940. Imports of machinery from other countries remained fairly steady, with the United Kingdom sending \$2,026,879 worth; Sweden, \$635,454; Switzerland, \$633,792; Canada, \$289,010; and France, \$114,845.

Approximately 25 per cent of all United States industrial machinery imports in 1940 consisted of textile machinery. Imports of this type of machinery dropped to \$1,031,414 last year from \$2,346,977 in 1939.

DPC Authorizes New Plant Expansions in Arms Program

••• The Defense Plant Corp., an RFC subsidiary, has authorized an increase of \$2,916,013 in its lease agreement with Consolidated Aircraft Corp., San Diego, Cal., for building and equipment of a new parts plant. A similar increase of \$500,000 was authorized for an ammunition plant being built by American Brass Co., Kenosha, Wis. The DPC has approved an agreement with Phelps Dodge Copper Products Corp., New York, to build and equip a copper products plant at Los Angeles at a cost of \$2,995,000, and a contract with Emerson Electric Mfg. Co., St. Louis, for a \$10,529,173 aircraft gun turret plant at St. Louis.

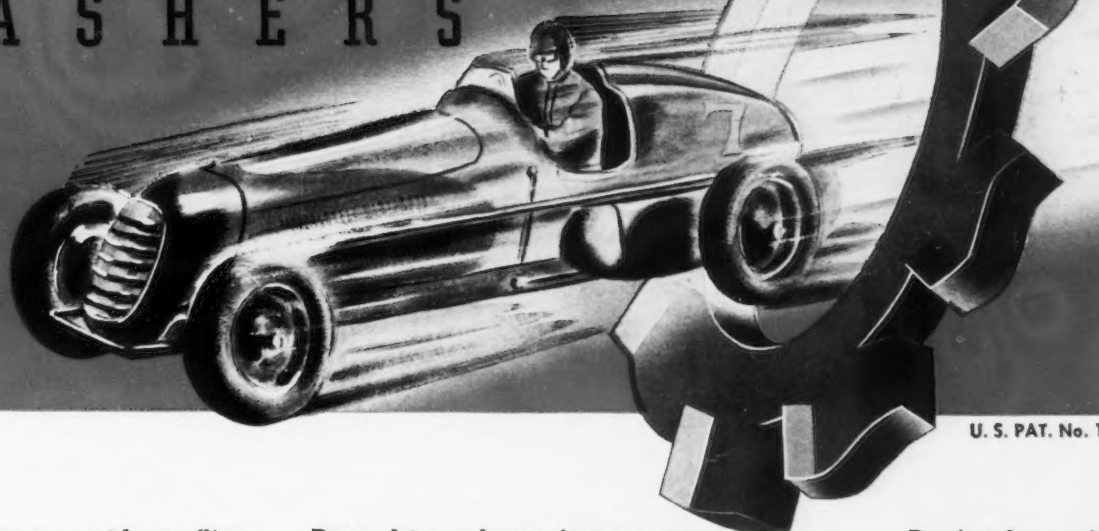
G-E Orders for Six Months Total \$521,139,000

••• Establishing a record for a six months' period, orders received by General Electric Co. during the first half of this year amounted to \$521,139,000 compared with \$212,653,000 for the same period last year, an increase of 145 per cent, reports Charles E. Wilson.

FOR SIX CONSECUTIVE YEARS

SPEEDY AUTO RACERS

Won with
**EVERLOCK
WASHERS**



U. S. PAT. No. 1775705

DANGEROUS accidents flirt with racing cars every second as they speed around the race track.

The daring drivers in the 1941 Indianapolis 500 mile Classic knew the dangers awaiting them if any nuts, bolts or screws loosened on their speeding cars. As a safeguard against this, all of the winners of the Indianapolis races for the past six years used EVERLOCK WASHERS and found them to be absolutely dependable.

What an endorsement for a lock washer!

Race drivers know from experience that the patented and exclusive construction of EVERLOCK WASHERS locks the nuts, bolts and screws tightly. Each EVERLOCK WASHER tooth digs in deeper and deeper as the vibration increases with the whirlwind speed of the motors. This digging-in action, coupled with the flexing of the EVERLOCK WASHER tongues, means a lock washer that stops the loosening of nuts, bolts and screws better than other locking devices.

Don't take a chance on your products! Take a tip from the auto race drivers and use EVERLOCK WASHERS on your assemblies. Your products too must be held intact during shipment and after being placed in service. EVERLOCK WASHERS will give your assemblies this security. Profit by the experience of champions and use them now.

There is an EVERLOCK WASHER of the right type and size for every purpose.



Congratulations to a real lock washer! We used EVERLOCKS on our cars and had a safe, confident feeling throughout the race. Every bolt, nut and screw was held tight.

1941
CO-WINNERS

*Maurice Rose
Rhyd E. Davis*



What a test for a lock washer! I used EVERLOCKS and they held perfectly.

SECOND PLACE *Ron Meyer*

Again I depended on EVERLOCKS and they did a real job.

THIRD PLACE *Ted Horn*



THOMPSON-BREMER & CO.
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CHICAGO ILLINOIS

PRINTED IN U.S.A.

OFTEN OTHER WASHERS HAVE BEEN TRIED, NOW EVERLOCKS ARE SPECIFIED

Urgency Ratings Now Given On Machine Tool Priorities

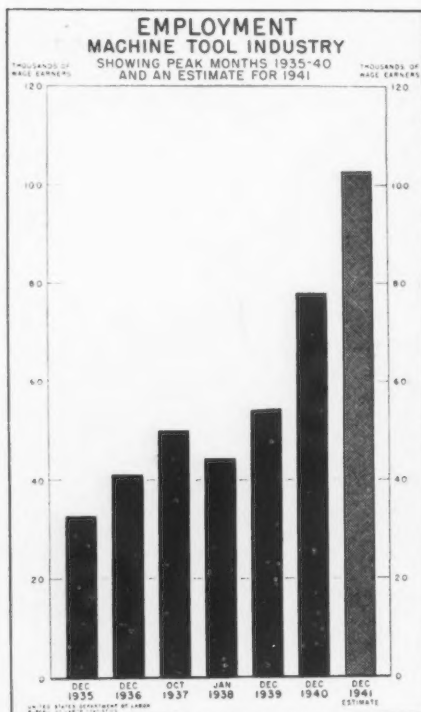
Washington

• • • A master preference numerical list of defense contractors who have urgent need of machine tools have been sent out by the priorities division of OPM in Supplementary Order No. 1 to General Preference Order No. E-1, under date of July 7. The former preference ratings of AA, A-1-a, A-1-b, . . . A-1-j; A-2, A-3, etc. . . . A-10, are being retained in this superseding order, but where two or more contractors who appear on the urgency list have been assigned the same preference rating, deliveries will be governed by the respective urgency standings. The only exception is that deliveries under contracts or orders placed by producers of machine tools and of cranes, cutting tools, gages, micrometers and chucks, which have been assigned a rating of A-1-a, shall be preferred over deliveries to any contractor appearing on the list because it takes machine tools and small tools to make machine tools.

The provision of urgency standings amounts to a further subclassification of the high preference ratings in the machine tool field. For example, two buyers of machine tools may have an A-1-a rating, and the required deliveries may conflict, but a discrimination may still be made between these conflicting orders because one contractor will have a higher urgency standing than the other.

It is also provided that, if two contractors have the same preference rating, the one who appears on the master list receives priority over the one who does not. If both appear on the list, then the decision will be made in accordance with the urgency standings of the contractors. On the other hand, a contractor *not* on the list who has an A-1-a rating will receive priority ahead of a contractor *on* the urgency list who has an A-1-b rating.

The order also provides that present schedules of production and deliveries of machine tools, unless a modification is specifically directed by the priorities division,



shall be maintained as they now stand until the following dates:

August 15, 1941 Group I

Engine lathes
External grinding machines
Gear machines
Jig borers
Planers
Profiling machines
Radial drills
Sensitive drills
Shapers
Surface grinding machines
Toolroom lathes
Upright drills
All others not specifically mentioned in Group II below.

September 15, 1941 Group II

Automatic lathes
Chucking machines
Horizontal boring, milling and drilling machines
Internal grinding machines
Milling machines
Multiple spindle screw machines
Precision boring machines
Reaming machines
Rifle barrel chambering machines
Rifle barrel drilling machines
Rifle barrel reaming machines
Rifle barrel rifling machines
Rifling machines
Thread grinding machines
Thread milling machines
Turret lathes
Vertical boring mills
Vertical turret lathes
All machines individually engineered for special operations.

After these dates, deliveries under contracts or orders bearing a lower preference rating shall if

necessary be subordinated in order to make deliveries under contracts bearing a higher preference rating on the date required. However, deliveries under higher rated contracts are not mandatory until 30 days after the date when the producers of machine tools receive notice of the higher rating for Group I tools and until 60 days after such notice for Group II machine tools. In general, this freezing of deliveries of certain tools for the periods specified above and the use of periods of grace before the rulings become mandatory have been made to minimize interference with existing delivery schedules of machine tool builders, due to the complex nature of the industry.

An exception to the general rule is made for orders or contracts placed up until now by Great Britain and other parts of the British Empire, including Canada. Pending further orders from the priorities division, production and delivery schedules on such machine tools will not be changed, whether such orders have a preference rating or not. It has been a matter of policy to give British orders equal standing with U. S. Army and Navy orders, but some British orders do not carry preference ratings high enough to assure the desired delivery.

In the letter of transmittal accompanying the order, which went out over the signature of E. R. Stettinius, Jr., director of priorities, it was pointed out that the list (which is confidential and restricted) includes only those contractors making items of high and urgent military necessity. Therefore as defense needs change from time to time, preference ratings and urgency standings on the list may be changed to place contractors in the proper position from the military point of view. In very urgent situations, the priorities division of OPM will direct diversions of a particular tool scheduled for quick delivery.

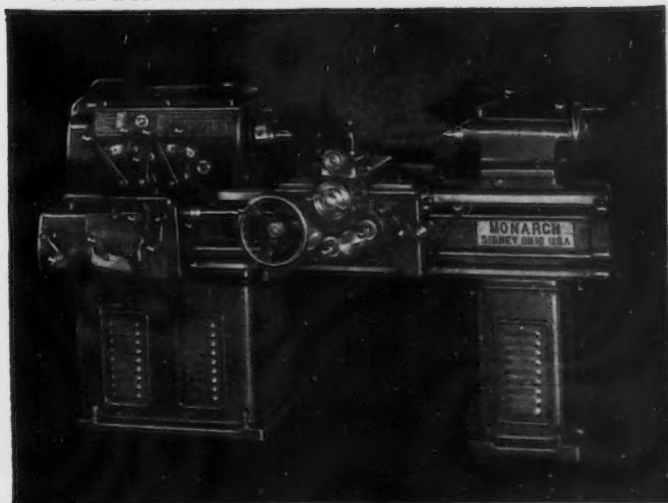
Prime defense contractors who take exception to deliveries scheduled in accordance with provisions of the new order will be directed by machine tool builders to take the matter up with the contracting officers of the Army or the interested bureau of the Navy.

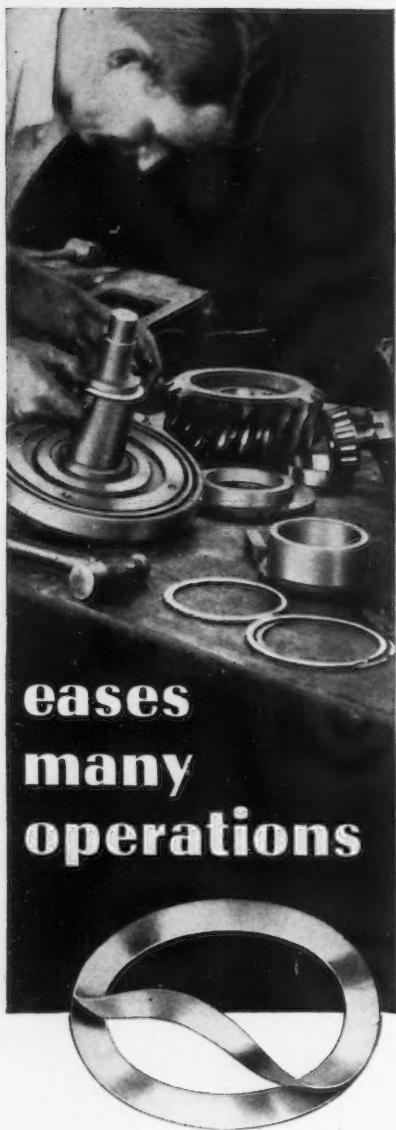
***WE NEVER TURNED
'EM OUT SO FAST OR
SO GOOD!***

FASTER...FASTER...is the word that comes down the line! And Monarch men will tell you that they are turning out lathes in numbers that far exceed our fondest expectations. And they're better lathes, too...because they're built to Monarch's constantly-improving standards. Yes, sir!... Monarch Lathes are slicing hours off defense production schedules...and turning out difficult jobs, in routine fashion. The Monarch Machine Tool Co., Sidney, O.

**MONARCH
LATHES**

A 12" x 30" Monarch lathe.





**eases
many
operations**

In this railway ballast cleaner, precision adjustments are essential. "The Laminum shim lets us use ordinary tolerances in an extremely difficult operation," say the builders. "Insures the exact positioning of pitch lines in mating worm and wheel of the digging head worm drive . . . also prevents slap in screen shaker eccentric. Adjustments by simply peeling!"

• Shims (.002 or .003 in. thick laminations) cut to your order. For repair or maintenance work, mill supply dealers will furnish Laminum stock shim materials.

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INCORPORATED
76 Union St., Glenbrook, Conn.

Write for file-folder of shim application photos—and Laminum sample.

LAMINUM

THE SOLID SHIM THAT *peels* FOR ADJUSTMENT

1666

Alabama Becomes A Little U. S. Arsenal

Birmingham

• • • Alabama, blessed with a wealth of raw materials necessary for steel-making, is rapidly becoming an arsenal within the "Arsenal of Democracy" as the government continues to place preparedness projects in this state and as Birmingham steel mills turn out record-breaking tonnages for defense.

Already under construction at a cost of more than \$100,000,000 are a smokeless powder plant at Childersburg, a shell forging plant at Gadsden, a bag loading plant at Talladega, an ammunition storage depot at Anniston and an ammonium nitrate plant at Sheffield.

Two weeks ago a contract was awarded Du Pont to build a \$25,000,000 high explosives plant at Childersburg and in the same week the War Department announced plans for a \$40,000,000 arsenal to produce smoke materials and other chemical warfare agents at Huntsville.

Just a few days before, the OPM announced it had recommended construction of a new aluminum plant in Alabama. Cost of this plant is estimated at \$75,000,000.

The Reynolds Metals Co. already

American Car Creates Officer of Munitions

• • • A Vice-President in Charge of Miscellaneous and Munitions Sales has been elected by the American Car & Foundry Co., Charles J. Hardy, president of the company, announced last week. W. L. Stancliffe, who holds the new office, was formerly manager of miscellaneous sales.

is turning out aluminum at its new plant at Listerhill in the Muscle Shoals district and production of rolled aluminum plates is expected to start soon.

The multi-million dollar expansion program of the Tennessee Coal, Iron & Railroad Co., which includes installation of a 140-in. plate mill, is progressing. Plates from this mill will be used in part by the shipbuilding program, which is being accelerated daily at Gulf Ports.

Much of the steel used at Gulf ports is made and fabricated in Birmingham and in addition Birmingham fabricators are supplying steel for other projects, both within and without the South, that have resulted directly or indirectly from defense requirements.

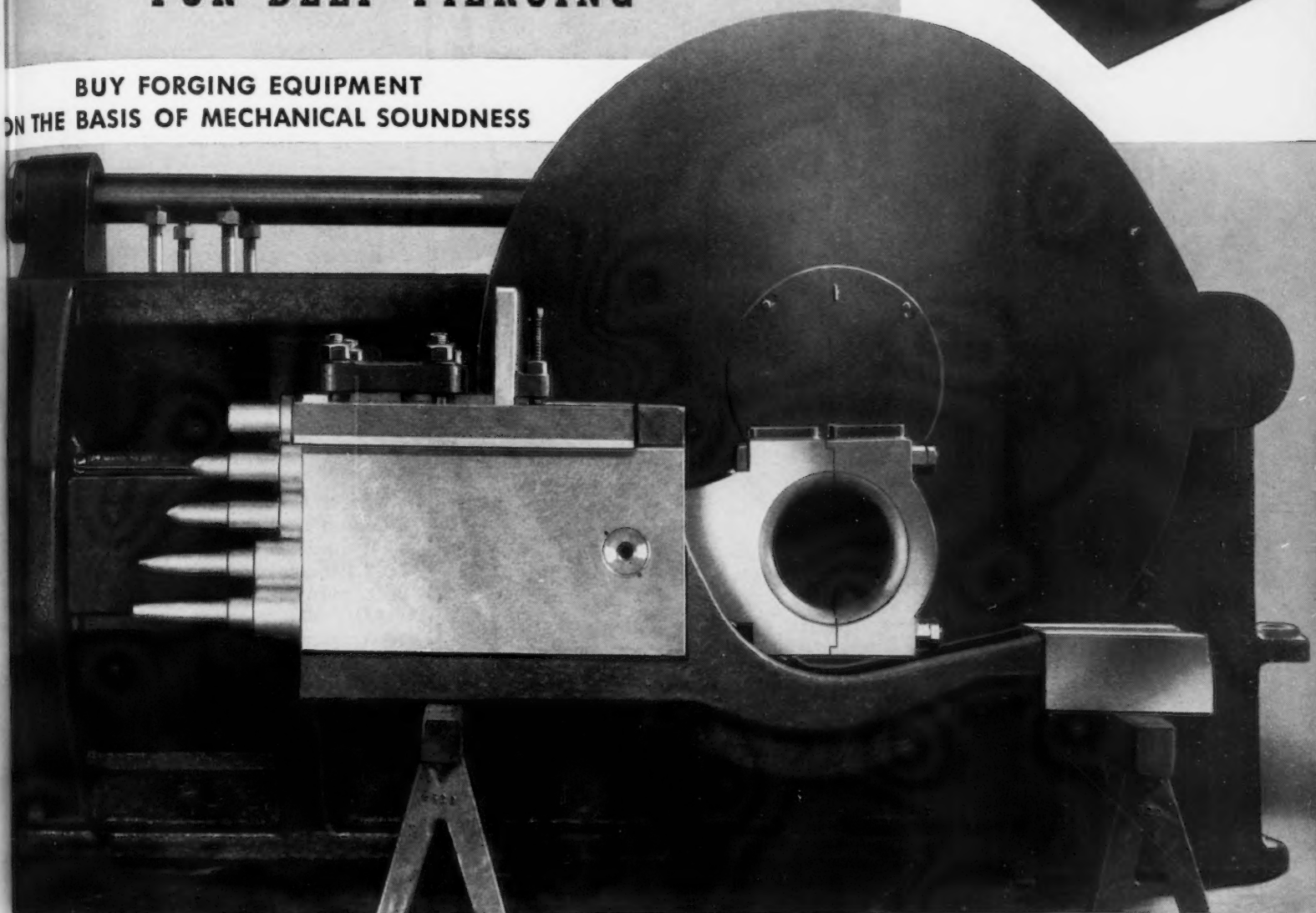
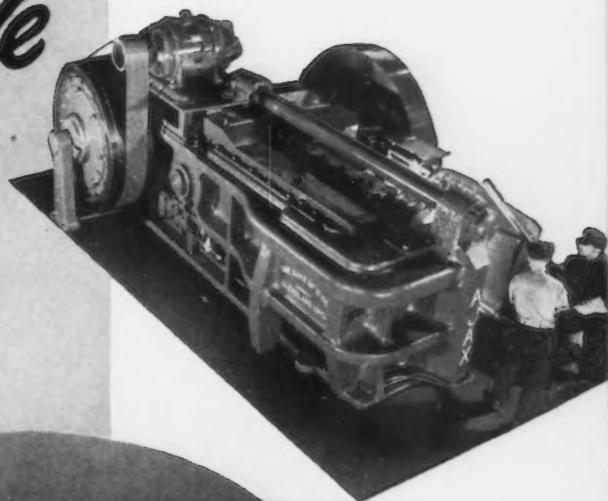
DEBRIS RESISTING: Workers in vital British defense plants are now having their bomb shelters brought to them. This new "Raidsafe" shelter was designed to provide protection in factories where production must be maintained even during air attacks. The shelter is described by its makers as withstanding a "tremendous debris loading."

Photo by British-Combine



EXCLUSIVE AJAX
Underarm Header Slide
EXTENSION GUIDED
ASSURES ACCURATE ALIGNMENT
FOR DEEP PIERCING

**BUY FORGING EQUIPMENT
ON THE BASIS OF MECHANICAL SOUNDNESS**



● The great overall bearing length of the underarm extension guided header slide in AJAX Forging Machines makes them superior for internal displacement forging and deep piercing.

The underarm header slide extension which is guided at the rear of the crankshaft in the bed frame at a neutral position remains accurately aligned with the main guide-way forward of the crankshaft regardless of the tremendous heading pressures. This prolongs piercer life and eliminates piercer breakage.

The multiple progressive piercing tools are guided into the die

impressions accurately centered in the partially pierced forging, even with the tremendous off-center pressures developed in multi-stage dies with operations far above and below the center line. The result is uniform-walled and close-concentric forgings.

Header slide alignment for accurate deep piercing on a high production basis, the complete accessibility of the pitman connection, and the ability to remove header slide and crankshaft independently when maintenance is required, are factors which should dictate the purchase of AJAX Forging Machines on the basis of mechanical soundness. Write for Bulletin 65-A.

THE AJAX

MANUFACTURING COMPANY

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EUCLID BRANCH P. O.
CLEVELAND, OHIO

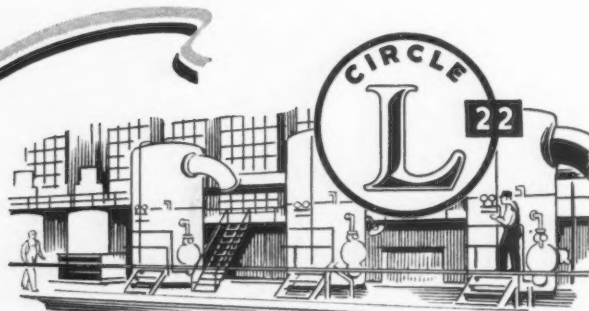
201 DEWART BUILDING
NEW LONDON, CONN.

SYMBOLS of DEFENSE



DECISIVE battlefields of World War I knew well the Yellow Cross of the 33rd or "Prairie" Division. On the ridges of the Meuse-Argonne and on the bitterly contested ground of Saint Mihiel, it proved to be the insignia of first class fighting men. At the Bois de Forges, the "Prairie" Division broke through strong enemy positions to protect the flank of

a successful American attack. 6,864 casualties were suffered in ninety-eight days of front line service. Today, the "Yellow Cross of the Prairies" is still proudly worn by the men of the Illinois National Guard. They are now in training at Camp Forrest, Tennessee, preparing to defend America against any possible adventure of aggressors or threat to its security.



"DECISIVE BATTLES" in many a defense industry are those fought against corrosion of vital equipment. In these combats, the symbol of Lebanon's Circle L 22 has become known as the insignia of sure protection. This 18 and 8 stainless alloy is used to resist acetic acid, alkaline liquors, ferrous sulphate, sodium sulphate, hydrogen sulphide at normal temperatures. Circle L 22 meets U. S. Navy requirements when a carbon maximum of .07 is specified. This low carbon content is made possible by melting in Lebanon's induction furnaces.

LEBANON STEEL FOUNDRY • LEBANON, PA.

ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

LEBANON *Stainless and Special Alloy* **STEEL CASTINGS**

G-M Gets \$50 Million For Allison Engines

• • • The War Department has awarded an additional contract for Allison liquid-cooled airplane engines, involving approximately \$50 million. The contract brings the total orders for Allison engines since the beginning of the present emergency to approximately \$242 million.

Allison engines power the Bell Airacobra, the Curtiss P-40, the Lockheed Lightning (P-38) and the North American Apache, pursuit and interceptor planes of the U. S. Army. The engine also is used by the RAF.

Three Contests Announced For Welding Advances

• • • Three groups, the Resistance Welder Manufacturers' Association, the Summerill Tubing Co., and the American Welding Society, will award prizes for papers advancing the art of welding at the annual meeting of the American Welding Society in Philadelphia in October.

The Summerill prizes of \$300, \$200 and \$100 will be for advancement in the welding of aircraft steels, including tubing. The papers may treat of any type of welding which can be used for the fabrication of structures or assemblies in the production of aircraft steels, and they may cover any phase of the problem. Papers must be submitted by Aug. 18 to the Aircraft Welding Contest, American Welding Society, 33 West 39th Street, New York.

Papers to be entered in the Resistance Welder Manufacturers' contest must be submitted to the American Welding Society by Aug. 31. One prize each of \$300, \$200 and \$100 will be awarded and four of \$25. Papers will be judged on educational research value, practical application and presentation.

The society itself will award its Lincoln gold medal, donated to the society in 1936 by J. F. Lincoln, president of the Lincoln Electric Co., to the author or authors of one of the papers published in *The Welding Journal* during the year. The four previous annual awards were: 1936-37 to T. M. Jackson, chief electrical and welding engineer, Sun Shipbuilding &



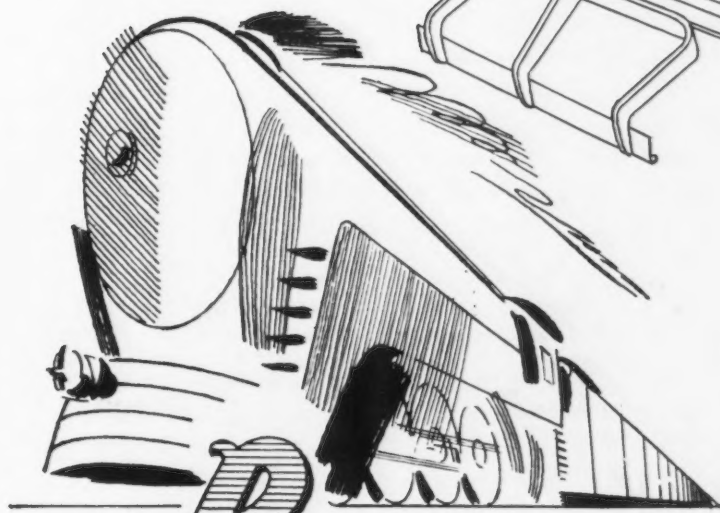
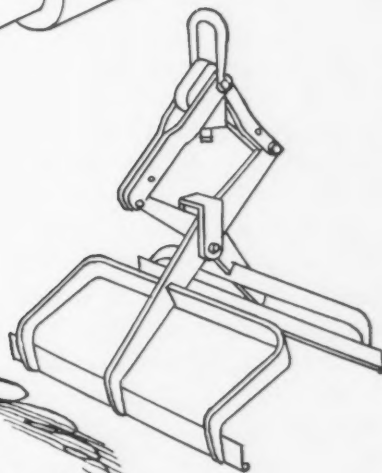
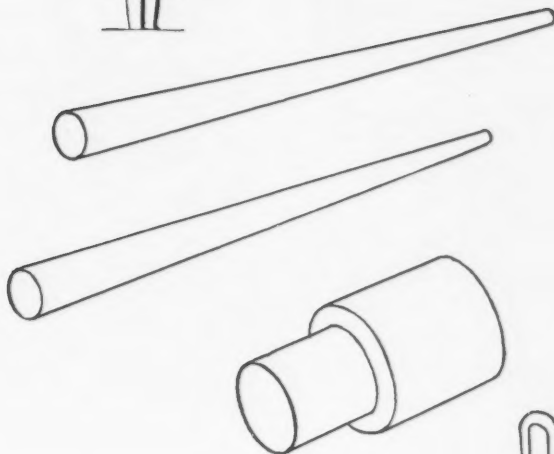
Photo by British Combine

SURFACE PIPELINE: Surface water pipes, threading some of the streets of London, facilitate the fighting of fires set by bombers.

Dry Dock Co., Chester, Pa.; 1937-38 to Dr. James Campbell Hodge, then chief metallurgist, Babcock & Wilcox Co., Barberton, Ohio, and Cornelius R. Sadler, vice-president, Babcock & Wilcox Tube Co., Beaver Falls, Pa.; 1938-39 to G. O. Hoglund, Aluminum Co. of America, and G. S. Bernard, Jr., Aluminum Cooking Utensil Co., both of New Kensington, Pa.; 1939-40 to H. J. French and T. N. Armstrong, Jr., International Nickel Co., Inc., New York.

Allis-Chalmers Picks Site For Supercharger Plant

•••The site of the old Inland Steel Co. here has been chosen by Allis-Chalmers Mfg. Co. and government engineers for the new plant to produce superchargers for airplanes. Total cost of the project with equipment will be \$12,500,000 and it is indicated the company will receive an initial order for \$20,000,000 worth of superchargers for which designs already are drawn.



The Railroad Industry

... has used and is using Heppenstall forged axles, crank pins, piston rods, die blocks for forging parts and products, Heppenstall Automatic Safe-T-Tongs for lifting materials, and "tailor-made" forgings. Heppenstall Company.

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"AIR DRY"

RACK COATING

**Remarkably resistant
plating rack insulation
drys in air—at
room temperature!**

Here's the new rack coating with a *combination* of properties that means valuable time and labor savings in the plating room.

Unichrome "Air Dry" Rack Coating withstands normal wear, hot cleaners and *all* plating solutions—without peeling, stripping or splitting. It produces thick, flexible coatings that: 1—Cannot contaminate the plating bath; 2—Adhere firmly even in severe plating cycles; 3—Cut cleanly and easily at the contacts.

Here are the seven big time- and money-saving advantages at a glance:

INSOLUBLE—withstands hot cleaners and all plating solutions

SAFE—contains no ingredients harmful to plating solutions

TOUGH—withstands wear and tear of handling

FLEXIBLE—withstands repeated flexing and bending

DURABLE—reduces the need for re-coating

CONVENIENT—any part can be patched without recoating the entire rack

EASILY APPLIED—dipping is done in the container in which it is shipped—the material dries at room temperature.

Address requests for further information or a trial order to the nearest office below.

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INCORPORATED**

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Waterbury, Conn.

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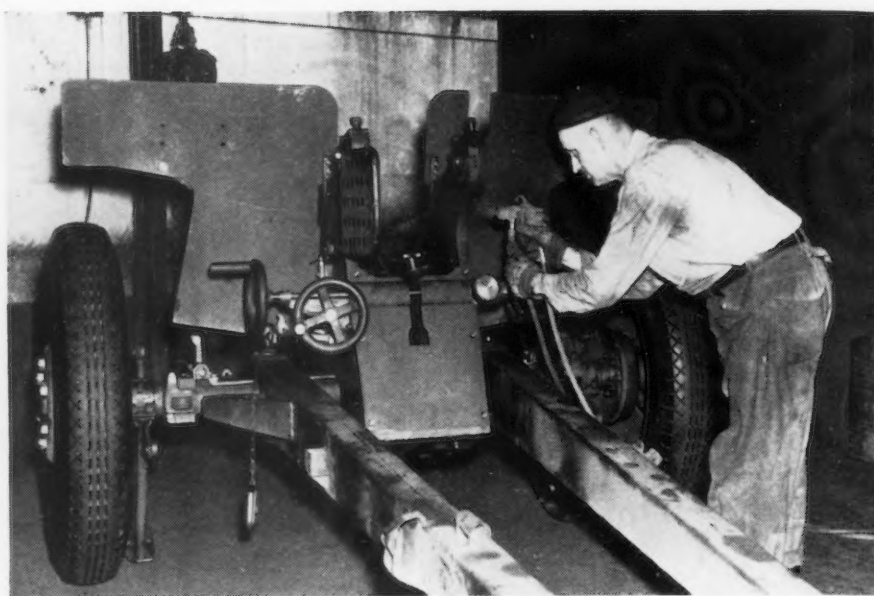


Photo by Wide World

GUN CARRIAGE: Shown here is the chassis of a 75-mm. gun carriage being spray-painted in the Parish Pressed Steel Co. gun shop at Reading, Pa.

Higher Coke Prices Send British Steel Costs Up

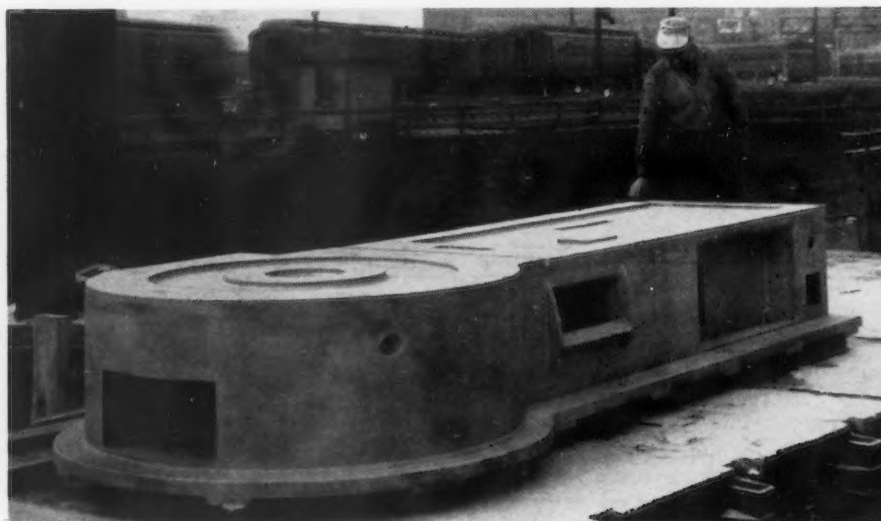
London

• • • A serious advance in production costs in the lighter steel industries of Sheffield has been caused by a rise of 55c. per ton in large selected patent oven coke and graded coke of all sizes used extensively in branches of the fine steel trades, the tool and cutlery

factories, non-ferrous foundries and workshops.

This rise brings the price up to \$8.08 to \$8.50 per ton at Sheffield depots. Graded coke also used in central heating is similarly advanced, while iron foundry coke and gas coke are increased 25c. per ton. All these price increases are due to the advance of 87½c. per ton in pithead coal prices. No advance in fine steel prices has yet been announced.

GEAR CUTTER BASE: Machining operations were reduced to a minimum on this base for an internal gear cutter to be used for cutting 9 ft. turbine ring gears. One of the advantages of welded construction, saving in machining time, was accomplished by flame cutting all the component parts to precise dimensions on an Airco Oxygraph cutting machine and by maintaining control of welding operations. Material was SAE 1020 steel plate varying in thickness from 2 in. for the base section to ¾ in. for some of the internal ribs. The work was done by Avery & Saul Co., South Boston, Mass. (Photo by courtesy of Wilson Welder & Metals Co., Inc.)



Allis-Chalmers To Open Books To UAW For Wage Study

Milwaukee

• • • The Allis-Chalmers Mfg. Co. offer made to Local 248 of the United Automobile Workers (CIO) and agreed to by both parties last week, provides for a conference between company and union for not later than Oct. 25, to review the firm's financial condition and determine whether it warrants paying additional compensation out of 1941 earnings.

• • • A wage increase of 5c. an hour was agreed to last week by Allis-Chalmers and the UAW. The increase applies also to overtime, with 7½c. additional to be paid for time and a half, and 10c. for double time. The company offer also specified that if during the contract year a general increase above the 5c. is granted any other company plant, the same increase will be given employees at West Allis, Wis.

U. S. Steel Corp.'s June Shipments Off 76,658 Tons

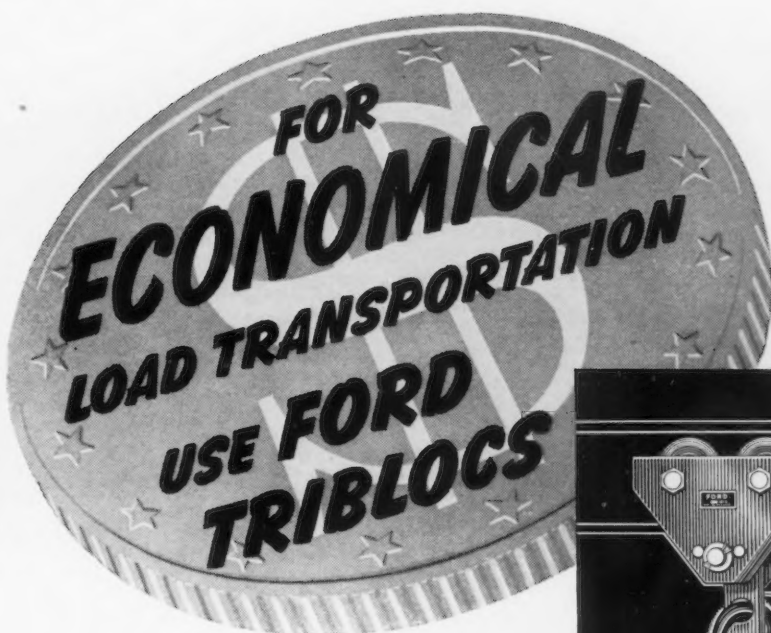
New York

• • • Shipments of finished steel products by subsidiaries of the United States Steel Corp., for June amounted to 1,668,637 net tons, 76,658 net tons less than shipments in May, bringing the total shipments during 1941 to 10,052,877 net tons.

June shipments established an all time high for the month, the previous high June having been in 1917 when 1,558,444 net tons were shipped. A record six months period has also been established, breaking the previous high shipping record made during the first six month of 1929 by 845,877 net tons.

\$170,000 Order Placed For Carbide Tool Tips

• • • U. S. Steel Export Co. has placed an order with McKenna Metals Co., Latrobe, Pa., for \$170,000 worth of Kennametal tool tips. This is believed to be the largest single order ever placed for carbide tool tips which are being widely employed in shell turning and other ordnance production in the United States and foreign countries.



FORD TRIBLOCS are not only low in first cost, but they are extremely low in maintenance cost. They provide the most economical load transportation—vertical by chain block and horizontal by Ford Trolley. FORD TRIBLOCS are fast in operation and are "on the job," ready for use at all times.

The FORD TRIBLOC is a quality spur-gear hoist. It is made throughout of high-grade drop forgings and malleable castings of certified grade. Its ACCO High Carbon Heat-Treated Chain has great strength and high elastic limit. Hoists are tested to a 50% overload before shipment. TRIBLOCS range in ¼-ton to 40-ton capacities.

Due to the fact that FORD TRIBLOCS are on the priority list our normal distribution is somewhat dislocated. But both factory and Ford distributors are working hard to supply demand.

FORD CHAIN BLOCK DIVISION

Philadelphia • Pennsylvania



In Business for Your Safety

AMERICAN CHAIN & CABLE
COMPANY, Inc.



Government Awards

War Dept., Ordnance:

Abrasive Machine Tool Co., East Providence, R. I.; grinders, abrasive and machines, milling.	\$169,319
Accurate Tool Co., Newark, N. J.; tools	4,403
Aelco Brass Foundry, Milwaukee; castings, aluminum	3,078
Albert & Davidson Pipe Corp., Brooklyn; pipes, black steel	4,698
Allis-Chalmers Mfg. Co., Milwaukee; parts, tractor	2,645
Aluminum Co. of America, Washington; ingots, aluminum	1,767
Aluminum Seal Co., New Kensington, Pa.; detonator parts	81,220
American Car & Foundry Co., Berwick, Pa.; parts for engine	1,387
American Cutter & Engineering Co., Detroit; punches and dies	21,900
American Locomotive Co., Schenectady, N. Y.; gun carriages	2,138,000
spare parts, tank	1,982,995
tanks	26,725,000
American Machine & Metals, Inc., East Moline, Ill.; dryers and baskets	2,694
American Rolling Mill Co., Middletown, Ohio; steel	10,647
American Spring & Mfg. Corp., Holly, Mich.; springs, steel	2,429
Ames Baldwin Wyoming Co., Parkersburg, W. Va.; shovels	2,128
Antonelli Fireworks Co., Rochester, N. Y.; cartridges, ignition	48,800

Apex Tool & Cutter Co., Inc., Shelton, Conn.; blades for milling cutters	4,132
Arguto Oilless Bearing Co., Philadelphia; punches, pocket	3,480
Armstrong & Son Co., New York; accessories, mortars	1,270
Associated Spring Corp., Barnes-Gibson-Raymond Division, Detroit; springs, helical	3,780
Atlas Powder Co., Reynolds, Pa.; cartridges, engine starting	32,625
Automatic Screw Products Co., Indianapolis; fuzes	233,612
Autovent Fan & Blower Co., Philadelphia; fans	1,113
Avey Machine Co., Cincinnati; presses, drill	2,390
Barber-Colman Co., Rockford, Ill.; machines, pinion hobbing	26,109
Barbour-Stockwell Co., Cambridge, Mass.; gray iron castings	1,563
Barwood & Co., Philadelphia; gages	4,901
Bendix Aviation Corp., Bendix Products Division, South Bend, Ind.; engine parts	1,059
Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J.; assemblies, starter	85,560
Bendix Aviation Corp., Marine Division, Brooklyn; transmitters and differentials	1,678
Bendix Aviation Corp., Scintilla Magneto Division, Sidney, N. Y.;	

spare parts for tanks	3,721
Benrus Watch Co., New York; centrifugal gears and shafts	83,900
Otto Bernz Co., Inc., Rochester, N. Y.; blowtorches, gasoline ...	1,300
Bethlehem Steel Co., Bethlehem, Pa.; bodies, forged bomb	72,681
E. W. Bliss Co., Brooklyn; shears, bliss	1,750
presses, punch	3,570
Boesch Mfg. Co., Danbury, Conn.; punches	10,640
Bohn Aluminium & Brass Corp., Adrian, Mich.; rod, alloy, aluminum	2,550
Borg-Warner Corp., Mechanics Universal Joint Division, Rockford, Ill.; fuze	1,586,000
Bowen Products Corp., Ecorse, Mich.; cases, cartridge	1,075,000
Breeze Corp., Inc., Newark, N. J.; spare parts for tanks	39,594
Brown & Sharpe Mfg. Co., Providence, R. I.; machines, plain milling	3,800
machines, grinding	13,736
machines, screw	13,554
Edward G. Budd Mfg. Co., Philadelphia; shells	870,000
Budd Wheel Co., Detroit; shells ..	427,040
Bullard Co., Bridgeport; lathes, turret	37,239
C. & G. Tool Co., East Orange, N. J.; tools, trays, and gages ..	2,552
Carboloy Co., Inc., Detroit; tools ..	21,350
Carnegie-Illinois Steel Corp., Chicago; steel	1,062

No build-up!

PHYTANIUM BLENDED

PATENTED



PENTRATE

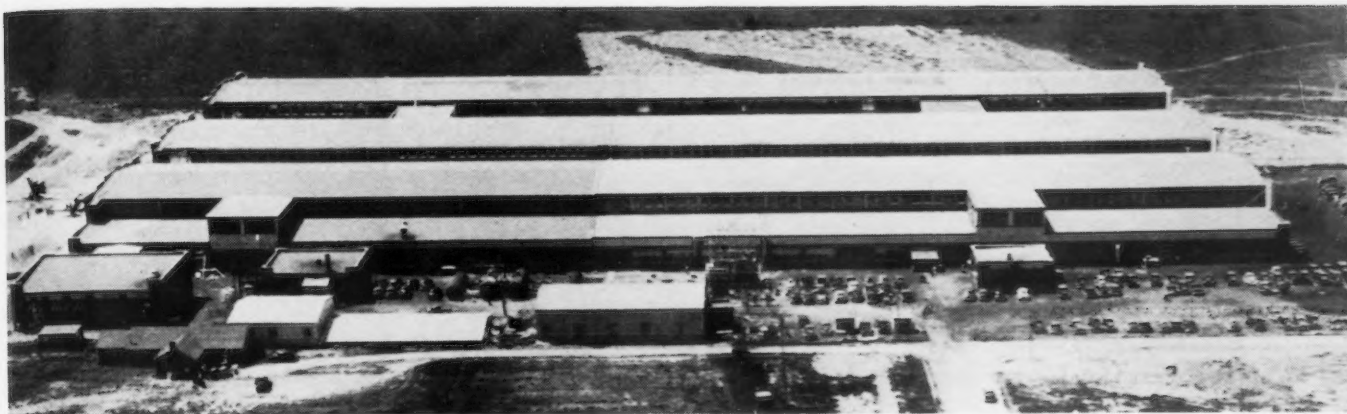
America's foremost penetrating **BLACK** finish for steel gives a durable, friction reducing, rust resisting finish—with **NO INCREASE IN SIZE OF PART TREATED**. National defense contracts and hundreds of industrial users endorse Pentrate. If your product is steel, send us samples for this rapid, economical treatment.

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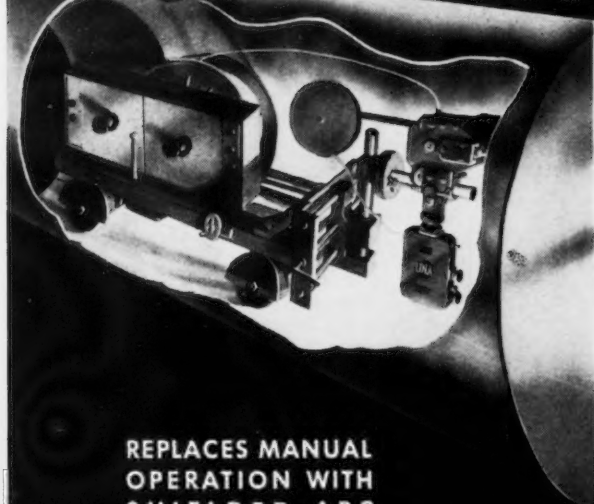
GOVERNMENT AWARDS



DOPE HOUSE: Shown in this aerial view from the "entrance and dope house side" are the new buildings of the National Steel Car Corp. medium bomber plant at Malton, Ont.

Carpenter Steel Co., Reading, Pa.; rods, drill	7,989	Cincinnati Gilbert Machine Tool Co., Cincinnati; radial drills, boring, drilling and milling machines	8,329	machines, milling	226,634
Casco Products Corp., Bridgeport, Conn.; primers	100,908	machines, boring, drilling and milling	125,955	profilers	45,606
Central Iron & Steel Co., Harrisburg, Pa.; steel, plate	2,163	Cincinnati Milling Machine Co., Inc., Cincinnati; machines, milling	9,827	E. D. Clapp Mfg. Co., Auburn, N. Y.; forgings, drop	1,996
Chase Brass & Copper Co., Inc., Waterbury, Conn.; bands, hard seamless	46,866	Cincinnati Milling Machines & Cincinnati Grinders, Inc., Cincinnati; grinders, cylindrical ..	14,118	Clark Equipment Co., Clark Tractor Division, Battle Creek, Mich.; truck, industrial	2,338
Chicago Malleable Castings Co., West Pullman, Chicago, Ill.; castings	2,025			Cleveland Cutter & Reamer Co., Cleveland; bits, tool	4,280
				Colt's Patent Fire Arms Mfg. Co., Hartford; revolvers	5,610
				gun components	251,679

UNAMATIC PROCESS



REPLACES MANUAL
OPERATION WITH
SHIELDED ARC
**AUTOMATIC
CONTINUOUS
WELDING**

WELDING INSIDE OF A 5 FOOT PIPE WITH UNA TAPER SHIELDED ARC

● Here's a unique but practical method for the automatic inside welding of a 5 foot pipe. The unit is exceptionally flexible and adaptable to any straight seam job such as booms, tanks, etc. Either butt welded high pressure water pipe or ordinary lap welded dredge pipe may be economically welded with this carriage unit. Carriage is self propelled with an adjustable speed motor and speed reducer to obtain speeds as low as 8 inches and up to 30 inches per minute. • Regardless of your present welding equipment if the job can be done automatically it will pay you to investigate a Una protected arc automatic welder. Consult one of our Engineering Representatives or write for full descriptive literature.

UNA WELDING, INC.
1615 COLLAMER ROAD
CLEVELAND, OHIO

FOR MILD, MEDIUM, HIGH CARBON
AND STAINLESS STEELS, ALLOYS
AND NON-FERROUS METALS



BETTER — AND FROM
3 TO 4 TIMES FASTER
THAN MANUAL WELDING

GOVERNMENT AWARDS

pistols and magazines	147,270	Crucible Steel Co. of America,	
endless belts	255,800	New York; steel	1,509
guns and parts	6,947,236	steel, molybdenum	1,225
Columbia Steel Tool Co., Chicago		Derbyshire Machine & Tool Co.,	
Heights, Ill.; steel	1,023	Philadelphia; punches and hold-	
Comtor Co., Waltham, Mass.;		ers	10,336
gages	1,431	Detroit Broach Co., Inc., Detroit;	
Conmark Products Corp., Newark,		details, broach section	1,416
N. J.; gages	39,304	Detroit Seamless Steel Tubes Co.,	
Continental Motors Corp., Muske-		Dearborn, Mich.; steel	5,805
gon, Mich.; flywheel assemblies	10,141	DeVilbiss Co., Toledo, Ohio; booth,	
parts for tank	1,235,523	wash, nozzle type with splash	
pins, valve tappet rollers	1,420	proof pump motor	1,003
Continental Tool Works, Detroit;		Driver-Harris Co., Harrison, N.	
cutters and pilots	3,666	J.; baskets, "Chromaz" steel ..	1,102



ONLY LAPPING *As Strom Does It* CAN PRODUCE SUCH PRECISION

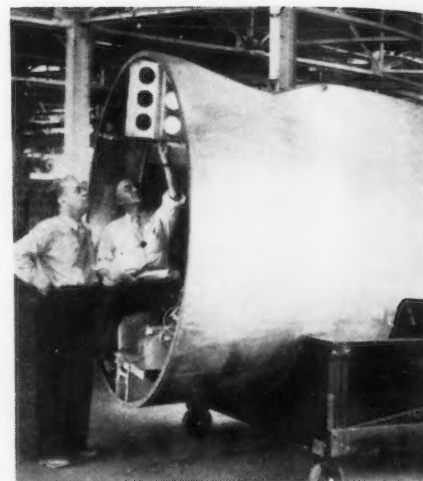
Strom Steel Balls possess a degree of surface smoothness and sphericity that has never been equalled in any other regular grade of ball. Such precision is exclusive with Strom because it can be attained only through a series of lapping operations such as are standard practice in the Strom plant.

Physical soundness, correct hardness, size accuracy and sphericity are guaranteed in all Strom Balls.

Other types of balls—*stainless steel, monel, brass and bronze*, are also available in all standard sizes.

Write for complete details.

Strom STEEL BALL CO.
1850 So. 54th Avenue, Cicero, Ill.
The largest independent and exclusive Metal Ball Manufacturer



BOMBER PART: Hudson Motor (rear fuselage section) of the shipped to Omaha for final as-plant.

Easy Washing Machine Corp.,	
Syracuse; primers	53,886
Edgcomb Steel Co., Philadelphia;	
steel, tool	6,520
Elwell Iron Works, H. F., Spring-	
field, Mass.; structural steel ..	1,288
Ever-Tite Mfg. Co., Davenport,	
Iowa; plates and gussets	5,523
A. B. Farquhar Co., Ltd., York,	
Pa.; presses, hydraulic	2,980
Federal Products Corp., Chicago;	
gages, cylinder	5,022
Fellows Gear Shaper Co., Spring-	
field, Vt.; hobs, gear cutting ..	1,427
Firth-Sterling Steel Co., McKees-	
port, Pa.; tools	16,790
Ford Motor Co., Dearborn, Mich.;	
carriages, motor	15,090
Fort Pitt Bedding Co., Pittsburgh;	
links, metallic belt	720,000
Fort Pitt Malleable Iron Co., Pitts-	
burgh; castings, grooved	1,257
L. B. Foster Co., Inc., Chicago;	
railroad rails	12,530
Foxboro Co., Foxboro, Mass.; con-	
troller, potentiometer	2,759
Fulton - Sylphon Co., Knoxville,	
Tenn.; fuze, metal parts	64,911
B. R. Gale Co., Boston; ventila-	
tors, roof	1,737
Gas-Weld Equipment Co., Inc.,	
Boston; equipment for welding,	
General Electric Supply Corp.,	
Allentown, Pa.; cable and wire,	
General Electric Supply Corp.,	
Springfield, Mass.; equipment,	
electrical	1,753
General Fireproofing Co., Youngs-	
town; desks, metal	3,381
General Machinery Corp., Niles	
Tool Works Co. Division, Hamil-	
ton, Ohio; machines, milling ..	371,120
General Motors Corp., Detroit;	
guns	337,714
General Motors Corp., Delco Ap-	
pliance Division, Rochester, N.	
Y.; gun directors	524,000
General Motors Corp., Delco Prod-	
ucts Division, Dayton, Ohio; fuze	
Giddings & Lewis Machine Co.,	
Fond du Lac, Wis.; machines,	
milling and drilling and grind-	
ers	54,544
Gordon-R Co., Detroit; machines,	
milling	16,920
Great Lakes Steel Corp., Ecorse,	
Detroit; plates, steel	12,317
sheets, steel	1,220

GOVERNMENT AWARDS



Car Co. will manufacture this part Martin B-26B bomber. It will be semby in a new Glenn L. Martin

Lincoln Engineering Co., St. Louis; fittings and guns, lubricating ..	1,309
shells	386,100
Lincoln Park Tool & Gage Co., Lincoln Park, Mich.; gages	18,249
Lindberg Engineering Co., Chicago; furnace, electric	3,122
Link-Belt Co., Indianapolis; chains	13,280
Lite Mfg. Co., New York; patches, cleaning	1,192
Ludlow Valve Mfg. Co., Troy, N. Y.; hydrants	1,196
Machinery & Welder Corp., Moline, Ill.; electrodes, welding	1,449
McKenna Metals Co., Latrobe, Pa.; tools	6,650

Mack Molding Co., Wayne, N. Y.; boosters	49,680
Marys Mfg. Co., St. Marys, Ohio; tracks	4,357
Mattatuck Mfg. Co., Waterbury, Conn.; springs, retaining	34,800
Mattison Machine Works, Rockford, Ill.; grinders, surface	10,243
Mesta Machine Co., West Homestead, Pa.; guns	1,863,140
Metal Products Corp., Miami, Fla.; fuzes	140,600
Midvale Co., Nicetown, Philadelphia; forgings	5,994
Modern Tool & Die Co., Inc., Philadelphia; gages	1,447

Introducing— TWO NEW NON-CORROSIVE ALLOYS

● Super B&M METAL

—Super B & M Metal Is Improved Aluminum Bronze.

● Stainless B&M METAL

—Stainless B & M Metal is a high Nickel Alloy—containing approximately 30% nickel.

PHYSICAL QUALITIES OF HOT ROLLED AND FORGED

	SUPER B&M METAL	STAINLESS B&M METAL
Diameter of Bar .....	.505	.505
Area .....	.2003	.2003
Yield Point, lbs. per sq. in.	55830	74800
Tensile Strength, lbs. per sq. in.	91700	91580
Elongation in 2"	38.5%	28.5%
Reduction of Area	46.7	70.8
Fracture	¾ Cup	¾ Cup
Specific Gravity	7.75	8.85
Weight per Cubic Inch	0.280	0.320

BOTH ARE AVAILABLE IN HOT ROLLED BARS — STRIP —
FORGINGS — BILLETS — CASTINGS

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WHEELING, W. VA.

Greenfield Tap & Die Corp., Greenfield, Mass.; gages	45,879
Gross & Janes Co., St. Louis; ties, switch	2,571
Hadley Special Tool Co., Inc., Boston; parts for machine guns ...	7,770
Hanchett Mfg. Co., Big Rapids, Mich.; grinders	34,544
Hannifin Mfg. Co., Chicago; recoil mechanisms	570,000
Hansaloy Mfg. Co., Davenport, Iowa; parts for tanks	3,494
Hanson-Van Winkle Munning Co., Matawan, N. J.; small arms equipment	1,140
Hanson-Whitney Machine Co., Hartford; taps, hand	1,716
Hardware & Supply Corp., Kansas City; axes	2,986
Hartford Electric Steel Corp., Roxbury, Mass.; castings, steel	1,025
Charles E. Hayes Co., Springfield, Mass.; fixtures, lighting	2,577
Heald Machine Co., New York; boremates	9,340
Herman Nelson Corp., Moline, Ill.; shields, starter	1,856
Hershey Mfg. Co., South Boston, Mass.; primers	51,246
Hesse Machine & Mfg. Co., Inc., Boston; gages	1,750
High Standard Mfg. Co., New Haven, Conn.; guns	4,724,841
John S. Holden, Attleboro, Mass.; primers	95,600
Hydraulic Controls, Inc., Chicago; pumps	4,650
Jones & Lamson Machine Co., Springfield, Vt.; machines, thread grinding	28,178
Jones & Laughlin Steel Corp., Pittsburgh; steel, carbon	1,607
Karp Metal Products Co., Inc., Brooklyn; chests, steel	2,628
Kearney & Trecker Corp., Milwaukee; machines, vertical, milling ..	35,941
Kent Aircraft & Machine Tool Co., Camden, N. J.; fuzes	18,463
Walter Kidde & Co., Inc., New York; extinguishers	1,663
Lamson Corp., Syracuse; gun mounts	50,910
La Pointe Machine Tool Co., Hudson, Mass.; machines, broaching ..	58,122
Leeds & Northrup Co., Philadelphia; speedomax	1,631
Leland - Gifford Co., Worcester, Mass.; machines, drilling	1,220

GOVERNMENT AWARDS

Mohawk Tool & Die Co., New York; gages	3,020
Morton Mfg. Co., Chicago; chests, ammunition	836,160
Motor Wheel Corp., Lansing, Mich.; shells	460,010
National Acme Co., Cleveland; equipment to complete automatic screw machines	3,319
National Cylinder Gas Co., Chicago; rods, welding	4,250
National Machinery Co., Tiffin, Ohio; header, double stroke	19,263
National Metals Co., Inc., Brighton, Mass.; track equipment	2,292
National Stamping Co., Detroit; links, metallic belt	2,665,900

National Tube Co., McKeesport, Pa.; projectiles	14,625
National Wire & Cable Co., Pittsburgh; cable	6,873
Neptune Meter Co., Long Island, N. Y.; fuzes	72,580
Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford; machines, gun-barrel reaming; rifling and drilling	38,307
blocks, gage	3,740
lathes	9,349
K. B. Noble Co., Hartford; generator set	6,528
Norton Co., Worcester, Mass.; grinders	27,211

wheels, grinding	1,967
Ocean City Mfg. Co., Philadelphia; primers	26,460
Ohio Steel Foundry, Lima, Ohio; castings, breech ring	1,689
Otis Elevator Co., Buffalo; castings, steel	2,198
Parker Rust-Proof Co., Detroit; tank, "Parkerizing"	1,284
Peerless Universal Machine Co., Racine, Wis.; saws, metal	3,326
Peterson Brothers Tool Co., Milford, Mass.; gages, inspection	2,290
Pittsburgh Water Heater Corp., Pittsburgh; primers, percussion metal parts	77,954
Pope Trading Corp., New York; tin	10,568
Henry Prentiss & Co., New York; grinders, centerless and machines, drilling	17,104
Proctor Co., C. D., Bridgeport; machines, grinding	2,140
Production Tool & Die Co., Inc., Springfield, Mass.; gages	1,380
Producto Machine Co., Bridgeport; machines, milling	7,560
Pullman Standard Car Mfg. Co., Hammond, Ind.; gun carriages, projectiles	2,448,000
Quality Tool & Die Co., Indianapolis; gages, inspection	1,284
gages	4,927
Racine Tool and Machine Co., Racine, Wis.; saws, hack	3,219
Rahaim Machine & Tool Co., Gardner, Mass.; gages	7,716
Republic Steel Corp., Chicago; steel	2,598
Republic Steel Corp., Union Drawn Division, Cleveland; steel	1,547
Revere Copper & Brass, Inc., Chicago; brass	2,475
Rivet Lathe & Grinder, Inc., Brighton, Mass.; lathe	1,531
Robbins & Myers, Inc., Philadelphia; hoists, electric	3,321
Rockford Machine Tool Co., Rockford, Ill.; planers	13,608
Ryerson & Haynes, Inc., Jackson, Mich.; cases, cartridge	716,000
shells	304,716
Joseph T. Ryerson & Son, Inc., Chicago; electrodes, welding	2,316
steel, nickel	1,941
steel	7,086
St. Louis Steel Products Co., St. Louis; assemblies, arming wire	20,836
St. Pierre Chain Corp., Worcester, Mass.; forgings	38,744
Sears Saddlery Co., Davenport, Iowa; helmets, tank and equipment	75,700
W. E. Shipley Machinery Co., Philadelphia; machine, case turning, coulter	10,555
machine, boring	49,665
Signode Steel Strapping Co., Chicago; steel	1,140
Standard Gage Co., Inc., Poughkeepsie, N. Y.; gages	9,764
Standard Pressed Steel Co., Jenkintown, Pa.; nuts for tripod machine gun	2,385
nuts, steel	1,896
Stanley Works, New Britain, Conn.; metallic belt links	1,168,000
Stockham Pipe Fittings Co., Birmingham; grenades	155,098
Strong Steel Foundry Co., Buffalo; steel castings	9,979
Taft-Peirce Mfg. Co., Woonsocket, R. I.; gages	7,287
Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis.; spare parts for tanks	65,650
drives, pivot	46,950
Titeflex Metal Hose Co., Newark, N. J.; tubes, assembly	16,844
Tri-Metal Products Corp., Conshohocken, Pa.; castings	2,547
Udylite Corp., Detroit; anodes, zinc	2,980

Emphasis on SCARCITY

● Scarcity emphasizes waste in use of men, machines and material. Waste must be relentlessly fought wherever it occurs. T & W forgings, formed to close tolerances, reduce the waste of metal, and enable skilled mechanics to utilize the productive capacity of machine tools to the utmost. T & W forgings are contributing importantly in the stepping up of production for National Defense. Some day, sometime in the future, T & W forgings may well constitute as great an advantage to you

in the battle for orders, as they are in readying our forces for the battle for freedoms.



TRANSUE & WILLIAMS
STEEL FORGING CORPORATION
ALLIANCE, OHIO

Sales Offices: New York, Philadelphia, Chicago, Indianapolis, Detroit and Cleveland

GOVERNMENT AWARDS


Underwood-Elliott-Fisher Co., Hartford; primers	48,830
Union Gear & Machine Co., Bos- ton; gears	6,213
Union Spring Mfg. Co., New Ken- sington, Pa.; washers	1,800
Union Twist Drill Co., Chicago; cutters and reamers	2,522
tools, cutting	1,546
United Carr Fastener Corp., Cam- bridge, Mass.; fasteners	1,396
United Engineering & Foundry Co., Pittsburgh; guns	1,220,199
United Shoe Machinery Corp., Bos- ton; extra parts for guns	128,514
guns	1,902,374
United States Rubber Co., Detroit; tracks for half track vehicle ..	10,929
U.S.L. Battery Corp., Metal Mfg. Division, Long Island City, N. Y.; projectiles, practice	550,000
Vascoloy-Ramet Corp., North Chi- cago, Ill.; tools	7,070
Veit & Young, Philadelphia; dies, punches and ejecting stems	26,134
Vinco Corp., Detroit; gages	3,790
Wallace Supplies Mfg. Co., Chi- cago; manifolds, exhaust	30,380
Warner & Swasey Co., Cleveland; lathes, turret	85,975
Watson-Stillman Co., Roselle, N. J.; valves, forged steel	1,029
Weaver Mfg. Co., Springfield, Ill.; trucks, bomb lift	68,876
S. Weinstein Supply Co., New York; tools	3,961
Weldon Tool Co., Cleveland; cut- ters, end milling	1,032
Westinghouse Electric & Mfg. Co., East Pittsburgh; small arms equipment	1,100
fuzes	43,000
Wright Aeronautical Corp., Pater- son, N. J.; hubs, flywheel	3,600
tools	3,041
Wyckoff Drawn Steel Co., Pitts- burgh; steel, cold drawn	12,942
Zimmerman Steel Co., Bettendorf, Iowa; castings, steel	34,008

War Dept., Air Corps:

Aro Equipment Corp., Bryan, Ohio; oil servo units	\$150,750
Bell Aircraft Corp., Buffalo; air- planes and spare parts	15,885,081
Bendix Aviation Corp., South Bend, Ind.; (letter of intent) air- craft machine gun turrets	10,000,000
Bendix Aviation Corp., Bendix Products Division, Bendix, N. J.; maintenance parts	105,247
Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J.; (letter of intent) booster coil, starter and switch assys.	10,750,000
Bendix Aviation Corp., Pioneer Instrument Division, Bendix, N. J.; (letter of intent) compasses, gages, indicators and regulators oxygen regulator parts	27,051,172
.....	157,928
Biederman Motors Corp., Cincin- nati; trucks-tractors	377,597
Boeing Aircraft Co., Seattle; tank assys., leakproof	498,830
Crescent Tool Co., Jamestown, N. Y.; pliers	82,950
Curtiss-Wright Corp., Airplane Di- vision, Buffalo; airplane mainte- nance parts	7,809,597
Douglas Aircraft Co., Inc., Santa Monica, Cal.; airplanes and spare parts	7,843,010
Firestone Steel Products, Akron, Ohio; (letter of intent) oxygen cylinders	850,000
Ford Motor Co., Dearborn, Mich.; (letter of intent) aircraft en- gines	11,500,000
General Cable Corp., Cincinnati; wire, iron, steel, brass and cop- per	82,583

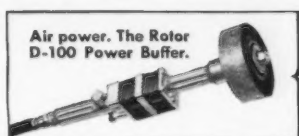
General Electric Co., Schenectady, N. Y.; (letter of intent) gener- ator assys.	1,375,000
General Motors Corp., Allison Divi- sion, Indianapolis; (letter of in- tent) aircraft engines and spare parts	8,500,000
Aeronautical engines	60,000
General Motors Corp., Chevrolet Motor Division, Detroit; engines and spare parts	89,075,000
General Motors Corp., Delco Remy Division, Anderson, Ind.; (letter of intent) generator assys.	1,500,000
Hussmann-Ligonier Co., St. Louis; electric refrigerators	24,080

Independent Engineering Co., O'Fallon, Ill.; oxygen generating plant	57,000
(letter of intent) oxygen cylin- ders	850,000
Jacobs Aircraft Co., Pottstown, Pa.; (letter of intent) equipment and materials for mfr. of air- craft engines and spare parts..	11,500,000
William H. Keller, Inc., Grand Haven, Mich.; pneumatic tools ..	61,890
Walter Kidde & Co., Inc., New York; (letter of intent) fire ex- tinguishers	3,250,000
oxygen cylinders	115,102



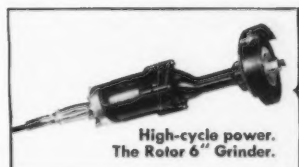
Three problems in one plant

...I licked them all with AIR and HIGH-CYCLE



Air power. The Rotor
D-100 Power Buffer.

Situation No. 1. A tough buffing job, calling for heavy pressure on wheel. Plenty of air available. Recommended Air tools—Rotor D-100 "Powerplus" Buffers.



High-cycle power.
The Rotor 6" Grinder.

Later—Situation No. 2. Defense orders required expansion of another department, with 12 tools—die grinders, straight grinders, and vertical grinders. Air compressor to run 12 tools only would cost \$2497. High-Cycle generator set of twice the capacity—that is to run ultimately 24 tools would cost \$1301 complete and could be delivered quicker. 12 Rotor High-Cycle tools were installed right away.



High-cycle power. The
Rotor 1/4" 407-D Drill.

Later—Situation No. 3. Wanted 1/4" drills for work next to office. Quiet operation required. Suggested running a high-cycle line to this location from their generator set. So this is a quiet High-Cycle job for Rotor 467-D Drills.

How about YOUR problems? With Air and High-Cycle, I can supply answers which fit your portable tool problems like a glove. See how this unbiased service and Rotor Tools can speed up your production and cut your costs!

THE ROTOR ANALYST

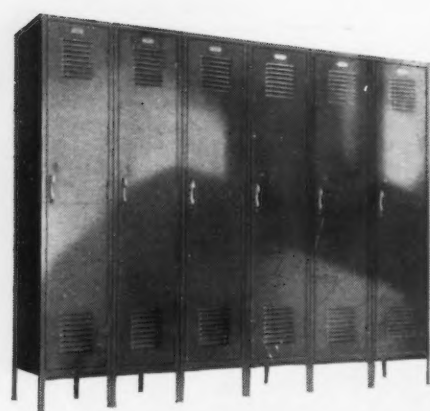
The Rotor Analyst has 65 different Air tools and 59 different High-Cycle tools with which to solve your problems.

THE ROTOR TOOL CO.

CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS





**USE MODERN LOCKERS
MEET INCREASING NEEDS
OF INDUSTRY**

● Mounting production keeps demanding more men . . . and when more men come into the plant expanded locker facilities are required. For your new or modernization locker program, you can be sure that your lockers fulfill every requirement—with A-S-E Lockers. There is a type for every need. They're durable, too, and have the stamina that modern industrial use demands. Attractive in appearance, they eliminate the maintenance costs which are so frequently encountered with less sturdily constructed lockers. Write today for full details.



**A-S-E SHOP EQUIPMENT
HELPS EXPANDING PRODUCTION**

● Industrial concerns are finding A-S-E Shop Equipment an effective aid in meeting their production schedules. Small parts are handled and stored easily and quickly with this well-designed and well-made equipment. Write today for the folder describing the time-saving advantages of A-S-E Stacking boxes, Stack-Units, steel boxes, taper pans, etc. There is no obligation.



ALL-STEEL-EQUIP COMPANY, Inc.
707 JOHN STREET
AURORA • ILLINOIS



Photo by Wire World

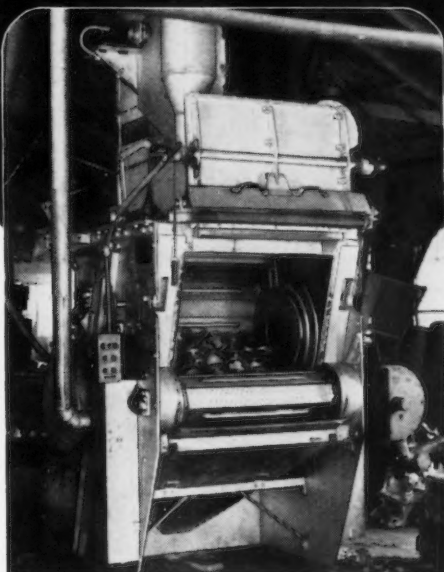
A WORKERS' MARKET: At Detroit, where much defense industry activity is centering, industry reports a "workers' market." Employment agency signs like that shown above reflect Detroit's shortage of skilled workmen. On June 15, for example, the city's employment figure had grown to 432,000 from 348,000 a year earlier.

Koch Butchers' Supply Co., North Kansas City, Mo.; electric refrigerators	73,958	Acorn Ins. Wire Co., Inc., Brooklyn; wire	7,800	
Leece-Neville Co., Cleveland; (letter of intent) generator assys....	450,000	American Laundry Machinery Co., New York; laundry equipment..	19,461	
Lite Mfg. Co., New York; target assemblies	628,056	American Safety Razor Corp., New York; 125,000 safety razors.....	29,375	
Lockheed Aircraft Corp., Burbank, Cal.; airplanes and spare parts ..	2,797,947	American Sterilizer Co., New York; tables, orthopedic	2,572	
North American Aviation Inc., Dallas, Tex.; airplanes and spare parts	57,725,572	Autocar Co., Ardmore, Pa.; tractor trucks	5,056,283	
Northrop Aircraft Inc., Hawthorne, Cal.; airplanes and spare parts	16,287,134	J. Bishop & Co., Platinum Works, Malvern, Pa.; syringe needles ..	10,680	
Plomb Tool Co., Los Angeles; socket wrenches	607,896	G. S. Blakeslee & Co., Chicago; dishwashers, electric	1,257	
Republic Aviation Corp., Farmingdale, L. I., N. Y.; airplanes and spare parts	8,165,400	Buffalo - Springfield Roller Co., Springfield, Ohio; rollers	28,472	
Roth Office Equipment Co., Dayton, Ohio; steel cabinets	193,235	Camillus Cutlery Co., Camillus, N. Y.; knives, pocket	46,200	
Sperry Gyroscope Co., Inc., Brooklyn; (letter of intent) gyro horizon, direction and turn indicators and automatic pilots	80,000,000	Chicago, Rock Island & Pacific Railway Co., Leocompte, La.; steel rail, angle bars and plates	187,113	
Square D Co., Kollsman Instrument Division, Elmhurst, N. Y.; (letter of intent) compasses, altimeters, speed indicators and tubes	4,300,000	Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati; milling machines	242,314	
Trailer Co. of America, Cincinnati; trailers, semi and dollies, trailer converter	287,548	Cleveland Dental Mfg. Co., Cleveland; forceps, tooth extracting ..	4,328	
Vultee Aircraft Inc., Downey, Cal.; airplanes and spare parts	31,619,280	Colorado Fuel & Iron Corp., Denver; pipe and fittings	5,442	
Westinghouse Elec. & Mfg. Co., Dayton, Ohio; (letter of intent) generator assys.	740,000	Consolidated Steel Corp. of Texas, Orange, Tex.; fabricated structural metal and hangar doors ..	38,697	
Wright Aeronautical Corp., Paterson, N. J.; aeronautical engines crankshaft assys.	159,480	Doehler Metal Furniture Co., Inc., New York; cabinets, instrument	14,892	
		Fargo Motor Corp., Detroit; half ton trucks	11,236,975	
		General Motors Corp., Chevrolet Division, Detroit; trucks	4,700	
			pickup and canopy express trucks	2,477
		Gillette Safety Razor Co., Boston; 275,000 safety razors	38,472	
		Graybar Electric Co., Inc., Chicago; augers	4,115	
			heat coils	1,307
			clamps	5,050
			wire	2,180
War Dept., Other Agencies:				
Acme Shear Co., Bridgeport, Conn.; scissors	\$8,448			

AWARDS

Grinnell Co. of the Pacific, San Francisco; manhole frames and covers	2,153
plumbing supplies	3,115
Hackensack Cable Corp., Hackensack, N. J.; wire	1,460
Harvard Lock Co. of N. Y., New York; mounting	3,262
Fred Haslam & Co., Inc., Brooklyn; forceps	110,630
C. Kirk Hillman Co., Seattle; churn drills, cast steel drilling cable and sand cable	21,743
International Harvester Co., New Orleans; pickup and canopy express trucks	1,714
International Silver Co., Meriden, Conn.; forceps	32,500
Joslyn Co., New York; wire	14,883
Kellogg Switchboard Supply Co., Chicago; wire	2,049
Lake Erie Engineering Corp., Buffalo; hydraulic forming press ..	98,745
Wm. Langbein & Brothers, Brooklyn; scissors	18,857
McWane Cast Iron Pipe Co., Birmingham, Ala.; fittings, cast iron	3,012
Mercury Mfg. Co., Chicago; tractors, electric, truck, trailers, truck, platform	50,069
Metal Office Furniture Co., Grand Rapids, Mich.; desks, nurses ..	38,269
National Cast Iron Pipe Division, James B. Clow & Sons, Kansas City, Mo.; cast iron water pipe ..	40,197
Northern Commercial Co., Seattle; tractors and bulldozers	29,063
Northwest Engineering Co., Seattle; parts for diesel engine ..	2,871
Arthur J. O'Leary & Son Co., Chicago; anchor rods	1,957
Pacific States Cast Iron Co., Provo, Utah; cast iron pipe	6,866
Payne Surgical Mfg. Co., Rochelle Park, N. J.; syringe needles ..	3,690
Peck, Stow & Wilcox Co., Southington, Conn.; pliers, pexto ...	2,955
Puget Electric Welding Co., Seattle; platform type trailers	2,075
Rex Cutlery Corp., Irvington, N. J.; scissors	36,850
J. A. Roebing's Sons Co., New York; wire	12,317
Simplex Wire & Cable Co., Cambridge, Mass.; wire	7,072
J. Sklar Mfg. Co., Long Island City, N. Y.; forks, tuning; retractors	2,375
clamps, forceps, carriers and dilators	8,991
scissors	6,275
Studebaker Corp., South Bend, Ind.; automobiles	1,492
Torrington Co., Torrington, Conn.; needles	48,688
United Transformer Corp., New York; coils	226,342
Wallace & Tiernan Co., Inc., Belleville, N. J.; cylinders, chlorine ..	2,150
Watson-Stillman Co., Roselle, N. J.; hydraulic press	1,825
Webster & Hedgcock Tractor & Equipment Co., St. Louis; crawler type tractors with bulldozers	7,270
Westinghouse Elec. Supply Co., Chicago; anchors and screws ..	1,010
White Motor Co., Cleveland; trucks, prime movers	1,957,800
S. S. White Dental Mfg. Co., Philadelphia; forceps, tooth extracting	4,304
burs, excavators, forceps	7,967
John L. Wick, Seattle; form clamps and tightening jacks ...	3,052
J. Wiss & Sons Co., Newark; shears	1,454
Yellow Truck & Coach Mfg. Co., Pontiac, Mich.; trucks, 2½-ton ..	851,717

IF IT'S A METAL CLEANING JOB- THE AIRLESS **WHEELABRATOR**



**WILL DO IT
FASTER AND
CHEAPER**

READ the WHEELABRATOR performance results shown below. Note the quantity of work handled and the high-speed cleaning possible. These are not unusual examples—they are typical of what more than 1300 WHEELABRATOR users will tell you can be done with this modern, speed-cleaning process.

We have compiled a 64-page book of letters from plants like these, enumerating the many ways by which WHEELABRATOR has brought them profits. Write for this book today—it's an eye-opener—ask for Book No. 25.



TYPICAL PERFORMANCE RESULTS

CHAMPION-DEARMONT TOOL CO., MEADVILLE, PA., is now cleaning loads of small tool forgings in a 20" x 27" WHEELABRATOR Tumbler in 8 to 10 minutes, whereas 30 to 45 minutes were required in their old air blast barrels. Power costs were decreased from 16¢ per load to 2¢ per load.

PARK DROP FORGE CO., CLEVELAND, OHIO, has been cleaning 13 to 15 diesel engine crankshafts in 10 minutes in their 48" x 72" WHEELABRATOR Tumbler. The crankshafts measure 54" long and 3" in diameter. They weigh approximately 200 lbs. each.

WERNER FOUNDRY CO., LANSDALE, PA., reduced cleaning time from 9 hours, using eight tumbling mills, to 1½ hours with a 36" x 42" WHEELABRATOR Tumbler, in cleaning 10 tons of brass castings. The castings now have a bright finish, and wire brushing has been eliminated.

THE PRIZER-PAINTER STOVE WORKS, READING, PA., cleans up to 5,000 pounds of stove plate castings per hour, both green and enamel iron, with a No. 3 WHEELABRATOR Multi-Tablast.

WEHR STEEL CO., MILWAUKEE, WIS., has been cleaning an average of 80 loads of green and annealed steel castings in 16 hours with their 48" x 48" WHEELABRATOR Tumbler. The average load requires only 6 to 8 minutes in the green and 8 to 15 minutes for annealed.

NATIONAL TELEPHONE SUPPLY CO., CLEVELAND, OHIO, was able to effect approximately a 37% saving the first year over the former method of processing their copper connector tubes by installing a small WHEELABRATOR Multi-Tablast having eight 12" diameter tables.



AMERICAN

FOUNDRY EQUIPMENT CO.

510 S. BYRKIT ST.

MISHAWAKA, IND.

OPM Seeks Alloy Scrap Conservation

Washington

• • • Calling attention to the fact that most of the alloying elements of alloy steel scrap are being permanently lost at present, H. LeRoy Whitney, iron and steel section of the Office of Production Manage-

ment, has directed a letter to all alloy steel consumers and manufacturers asking them to cooperate in a program of alloy steel scrap conservation. Specifically manufacturers are requested to take prompt steps to insure the proper segregation and identification of alloy scrap into 11 grades and the return of such scrap in acceptable and usable form, free from contamination, either direct to their

suppliers or to their scrap metal dealer.

In manufacturing plants at least 20 to 40 per cent of the alloy steel as delivered by steel producers is lost as scrap during conversion into finished products and in some aircraft parts, like landing gear struts, this loss runs as high as 70 to 80 per cent. This scrap represents a large potential reservoir of alloying elements, particularly nickel.

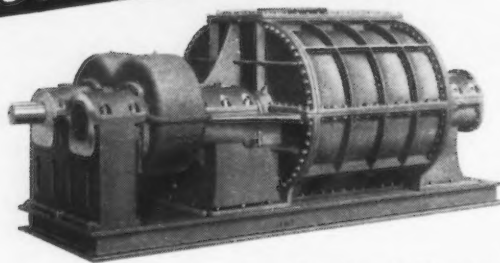
The proper segregation and identification of the various grades of heavy melting scrap is largely a matter of supervision and provision for adequate storage space, but light scrap such as turnings or chips involves baling or briquetting as well as crushing or washing if the cutting oil is to be recovered, Mr. Whitney points out in his letter.

It is believed that most plants will find that the premium price obtainable for the nickel content of scrap on the basis of the maximums set by OPACS will compensate for the supervision and handling involved and will in many instances effect operating economies.

POSITIVE DISPLACEMENT

Puts AIR and GAS where you want it.

Gas Pumps

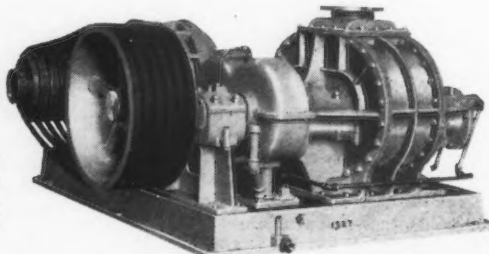


Gas booster delivering 780,000 C.F. Hr. of coke oven gas against 4½ lbs. pressure.

In choosing the type of gas booster or exhauster for any particular application it pays to know the advantages of "R-C" Positive Displacement Gas Pumps. Boiled down to fewest words, the essential advantages are these—"R-C" Gas Pumps take less power, are suitable for varying pressures, are positive in displacement, and give years of trouble-free service.

Detailed data on the subject are given in our new Bulletin No. 32-33-B-11. Ask for your copy.

Blowers



"R-C" Blowers have the same advantages as the gas pumps. Built for pressures from 8 ozs. to 15 lbs. and for any volume up to 50,000 CFM.

Remember, too, that no liquid or seal is used inside "R-C" rotary positive displacement units so that air or gas is delivered as clean as at inlet and in definitely measured volume that is unaffected by changes in temperature or barometer.

Blower with capacity of 1800 C.F.M. of AIR at 3½ lbs. gauge pressure.

Roots
CONNERSVILLE

BLOWER CORPORATION

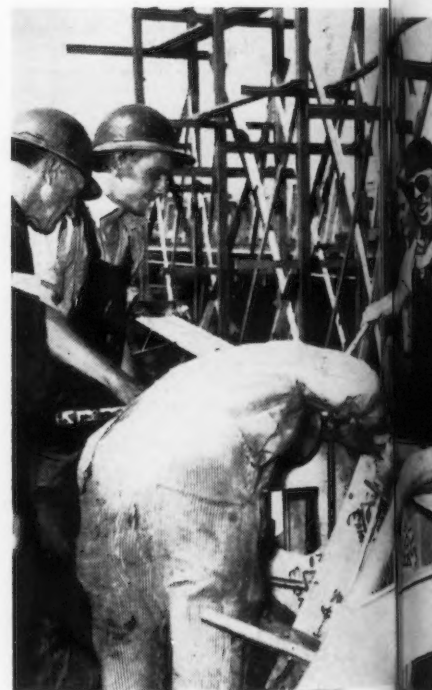
107 Ohio Ave.

Connorsville, Ind.

NEW YORK CHICAGO POTTSTOWN, PA. SAN FRANCISCO
DETROIT ST. LOUIS LOS ANGELES PITTSBURGH BOSTON



THAT'S INSPECTING: William S. visited three West Coast ship plant in one day. He is shown manager of the Seattle-Tacoma inspecting work on a destroyer's



At a meeting held on July 8 with alloy steel makers and officials of OPM it was announced that the Wright Aeronautical Corp., Paterson, N. J., is spending \$130,000 for the installation of scrap reclamation equipment. The company expects to amortize the equipment inside a year based on higher prices obtained for alloy grades of scrap.

A sub-committee of the American Iron and Steel Institute has been formed on alloy steel scrap conservation. According to the chairman, C. H. Herty, Jr., research engineer, Bethlehem Steel Co., the chief problem is to determine how much alloy scrap there is and where it is. His committee plans to circularize prominent users of alloy steels to find out how much scrap is not going back into steel mill production. The most suitable methods of preparing alloy steel turnings for mill use will also be studied and an attempt will be made to correlate the points at which scrap is being prepared and at which it is being used.

David A. Uebelacker, nickel division of OPM, said that based

upon returns from buyers of nickel, it is obvious that nickel alloy steel scrap is not coming back to them. Steel companies, he said, are getting about 63 to 70 per cent of the available nickel supply. A potential new mine of nickel is to be found in the scrap pile.

Speaking at the same meeting, T. H. Wickenden, assistant man-

ager, research department, International Nickel Co., pointed out that a good nickel ore assayed only 1½ per cent nickel. Aircraft industry scrap, on the other hand, averaged 2.75 per cent nickel. Due to the rapid expansion of the aircraft industry, there had been no time to consider the scrap situation until now.

Incidentally, Mr. Whitney, indi-



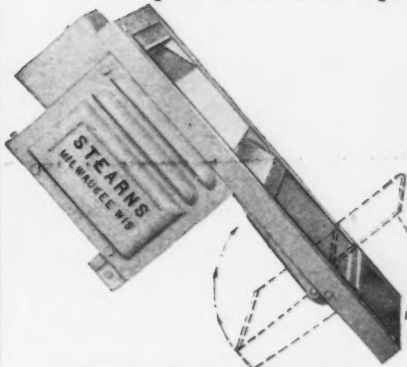
Protecting Against TRAMP IRON with STEARNS Magnetic Separators

Tramp iron was damaging grinders used to prepare scrap acetate for reuse by an Eastern plastics manufacturer. Stearns Spout Magnets were recommended—result, tramp iron caught efficiently, economically and automatically.

Tramp iron is a prevalent menace to smooth, profitable production. The judicious use of Stearns Magnetic equipment is your best insurance against expensive repairs to machinery . . . costly shutdowns . . . hazardous fires and explosions . . . possible loss of lives . . . law suits and such business head aches.

If you have a tramp iron problem consult Stearns

Magnetic at Milwaukee. Write for Spout Magnet data, Bulletin 92—Giant Spout Magnets, Bulletin 97—Dust-tight Spout Magnets, Bulletin 93—Magnetic Pulleys, Bulletin 301—Suspended Magnets, Bulletin 25. No obligation.

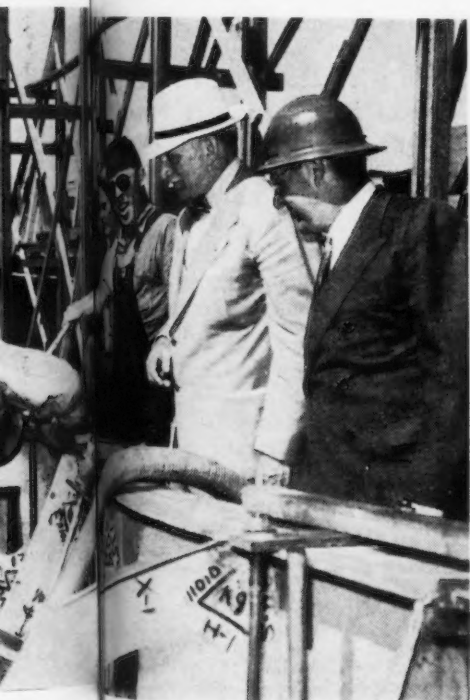


Stearns Spout Magnets are designed in sizes to suit your capacities.

**STEARNS MAGNETIC
MANUFACTURING CO.**

635 S. 28th St. Milwaukee, Wis.
SEPARATORS • CLUTCHES • MAGNETS

Knudsen, OPM director, recently yards and the No. 2 Boeing airplane above with O. A. Tucker, general Shipbuilding Corp. Seattle yard, in-keel.



cated that the International Nickel Co. was spending a large sum of money to open up a new nickel mine in Ontario, but that it would be two years before the output of this mine was available to industry. The existing scrap piles in the United States constitute the biggest mine of nickel readily available, he said. Later, Mr. Uebelacker said that the available

supply of virgin nickel is now 15,000,000 lb. per month. Defense demands with A priority ratings require 12,500,000 lb., and the total potential demand is 21,000,000 lb., leaving 6,000,000 lb. a month going unsatisfied. Except for resort to the scrap pile, there is no outlook for a vastly increased supply in the near future. Mr. Uebelacker also warned that

Equipped for Action!

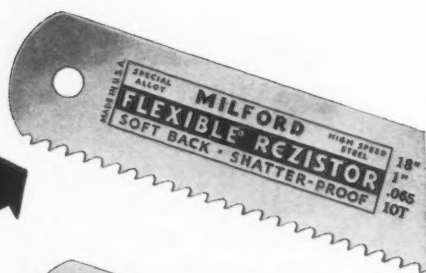
The ability to cut more metal faster is basic in Milford Hack-saw blades — built right into them by their maker.

FLEXIBLE REZISTOR

Eliminates breakage. Shatterproof and unbreakable in use. Hard, keen teeth supported by a tough, annealed back. For use on all power machines having a high blade-breakage factor.

ALL-HARD REZISTOR

The toughest all-hard high-speed blade. Delivers 25% more cutting per dollar than a tungsten high-speed blade. Fast cutting, accurate and durable.



Milford Rezistor Hacksaw Blades are made from domestic special-alloy, high-speed steel — constant supply assured.

★ Made also in hand-frame sizes with Duplex Easy-starting Teeth.

MILFORD

REZISTOR HACKSAW BLADES • PROFILE SAW



★ Send for this helpful booklet. It tells how to choose and use hacksaw blades and explains labor-saving methods employed by master craftsmen—20 pp. illus.

THE HENRY G. THOMPSON & SON CO.

NEW HAVEN, CONN.

Mill Lifts Wages 1½c Over Steel Minimum

Bridgeville, Pa.

• • • A union shop contract between the Universal Cyclops Corp. and the CIO Amalgamated Association of Iron, Steel & Tin Workers was signed last week and provides a wage minimum of 74c. an hr., 1½c. higher than the common wage rate prevailing in the steel industry. Vacations of one week for employees with three years service and two weeks for employees with 15 or more years are provided, as well as time and a half for overtime and for all work on Sundays and six holidays.

The contract will be retro-active to July 1 and writes the final chapter in a series of disagreements over wage rates which kept the plant idle 46 days in the first three months of this year.

while nickel was the most critical alloying element now, signs pointed to chromium next becoming acute.

\$46 Million Munitions Project for Alabama

Washington

• • • Plans have been completed by the War Department for construction of a new manufacturing arsenal to produce smoke materials and other chemical warfare agents at Huntsville, Ala., and for an ordnance assembly plant, also at Huntsville, to be operated in conjunction with the arsenal.

The cost of the arsenal, including buildings, equipment, and engineering services, will be approximately \$40,000,000; that of the assembly plant \$6,000,000. The new arsenal will include chemical manufacturing plants, plants for loading chemical shells, a storage depot, laboratories, shops, offices, hospital, and warehouses for receiving and shipping. More than one million square feet of floor space will be required for the manufacturing operations.

Herman Nelson Corp., Moline, Ill., on July 1 purchased the Autovent Fan & Blower Co., Chicago, makers of centrifugal blowers. The business will be operated as the Autovent Fan & Blower Division of the Herman Nelson Corp., and the complete line of Autovent products will continue to be manufactured.

Scrap Scarcity Cuts Efficiency of Mills

Pittsburgh

••• While curtailment of steel operations has not yet resulted from a lack of scrap except in a few instances, efficiency of operations has been impaired with the result that less steel is being produced than could be if more scrap were available or if current scrap supplies reaching the mills were generally of a better grade, a survey made here indicates.

Some steel mills have so reduced their scrap pile that mechanical difficulty in charging furnaces has adversely affected production. Other open-hearth furnaces are not producing up to the standard yield owing to inability to obtain enough primary scrap grades. Melters have had to rely upon a greater amount of secondary scrap and in some instances claim that even primary scrap shipments are not up to standard quality.

Many steel plants could produce more ingots than they are currently doing, but are unable to get scrap in sufficient quantities to reach such higher levels. Serious dislocation of production is believed to be imminent within a month or so unless the flow of scrap increases and unless a greater amount of primary scrap is available, it is said here.

The situation is further complicated because in former times a slow up in scrap supplies was taken care of by increasing the percentage of pig iron in the melt. With a threatened shortage in pig iron and possible allocation of available supplies impending, older methods of solving the problem cannot be used.

Steel sources are worried about the future, especially the winter months of this year when natural causes will slow up collection of scrap. Some companies have no more than a floating week's supply of scrap, indicating that if anything should happen to current shipments coming in, this last and final reserve would be used up quickly.

Priorities Management Department Formed by A-C

••• A new department at the Allis-Chalmers Co. to be known as "Priorities Management" was announced this week by Max W. Babb, president. "It has become necessary," said Mr. Babb, "that an organization should be set up to help in directing the company's activities in matters pertaining to priorities. The general purpose of

this organization is one of coordination and assistance and is not designed to take over any of the obligations and duties which are now a function of other departments.

"To this end the Priorities Management department has been established with L. W. Grothaus, vice-president, as its head, G. V. Woody as administrator and O. S. Larkby, Jr., as his first assistant."



CARLINE BRACKET — Used for connection between side posts and roof carlines in body frame construction of present type trailers.

PARISH

STAMPINGS

Travel Light

Buses, trailers, railroad cars, and all transportation units, earn dividends through light weight construction. This is made possible by using high

strength, corrosion resistance stampings.

To witness:—These brackets made by Parish are of .050" Ga. and 3/16" High Tensile Steel. They bring sturdy endurance, increased pay-load capacity to trailers.

Parish engineers can bring an added value to your product. Let us show you how.



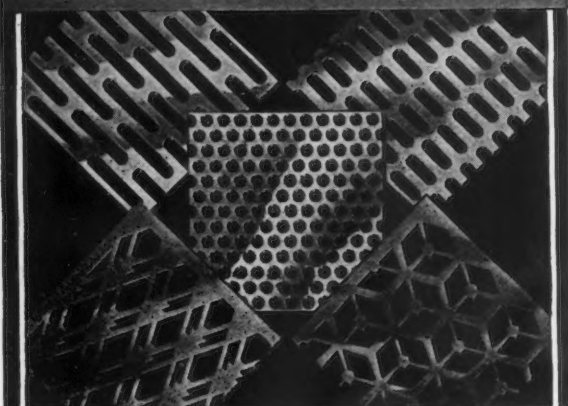
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Pacific Coast Representative
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Harrington & King
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**ARE YESTERDAY'S DIE RUNS
A MERE "DROP IN THE BUCKET?"**



Investigate

JESSOP 3C High Carbon-High Chrome Die Steel

Because of high wear resistance, dies made from Jessop 3C High Carbon-High Chrome die steel are capable of phenomenally high runs before stoning is necessary. This results in far less press shutdown time and in longer die life—both factors being important to production speed-up. Furthermore, 3C is an oil hardening steel that can be heat treated with greater safety—lessening the risk of spoiling tools and dies by inexperienced men.

If defense orders, or an increase in your normal business, require several times your former die production—investigate Jessop 3C die steel. Descriptive Bulletin 341 sent free upon request. Write JESSOP STEEL CO., 537 Green St., Washington, Pa.



1901 CELEBRATING OUR 40TH ANNIVERSARY 1941
Jessop Steels of America
CARBON • HIGH SPEED • SPECIAL ALLOY •
STAINLESS • and COMPOSITE STEELS

British Simplify Plans For Steel Distribution

London

••• All steel users throughout the United Kingdom are being sent a pamphlet from the Iron and Steel Control, giving the main outline of the distribution of steel supplies plan as it affects steel consumers. Before steel can be acquired for any purpose, the buyer must have an authorization from the government department responsible for the work for which the steel will be used or a sub-authorization from a firm or person holding a government authorization.

A number of developments are evident in the new pamphlet as compared with the last, which was circulated in September, 1940. For example, the responsibility of issuing all authorizations for steel for hand tools has been grouped under the Hand Tool Directorate of the Ministry of Supply. This constitutes an important simplification, as hitherto application for steel for tools had to be made to one of many different departments.

Another significant change is that the Supply Ministry, in addition to handling its own vehicle program, will authorize steel for automotive vehicles and spare parts for all government departments and industrial uses, thus having centralized control over the flow of steel into the vehicle industry.

If a supplier of finished steel is unable to accept an order for delivery in the period authorized, the customer may place the order for delivery in a later period, provided the department involved does not object. When the order is not placed before the end of the authorized period a new authorization must be obtained.

The only exceptions to the use of these authorizations are the licenses issued by the Iron and Steel Control, the allocations issued on behalf of the Food Ministry and the Board of Trade by the Administrator of Tinsplate Distribution, the authorizations issued by the Ministry of War Transport Surveyors and certain modifications applying to firms which purchase only very small quantities of steel.

Steel Capacity Expansion Involves \$284,264,000 Outlay Washington

••• Iron and steel capacity expansion at the end of May involved an outlay of \$284,264,000, of which \$135,660,000 was government and \$148,604,000 was privately financed, according to the OPM Bureau of Research and Statistics. The total value of defense industrial facilities for which government and private commitments had been made was \$3,061,087, of which \$2,290,851, was government and \$770,236,000 was privately financed.

The report points out that on May 15 there were pending applications for certificates of necessity totaling \$280,700,000 which have not been included in the compilation because an allocation to public or private source of funds was not possible in many cases.

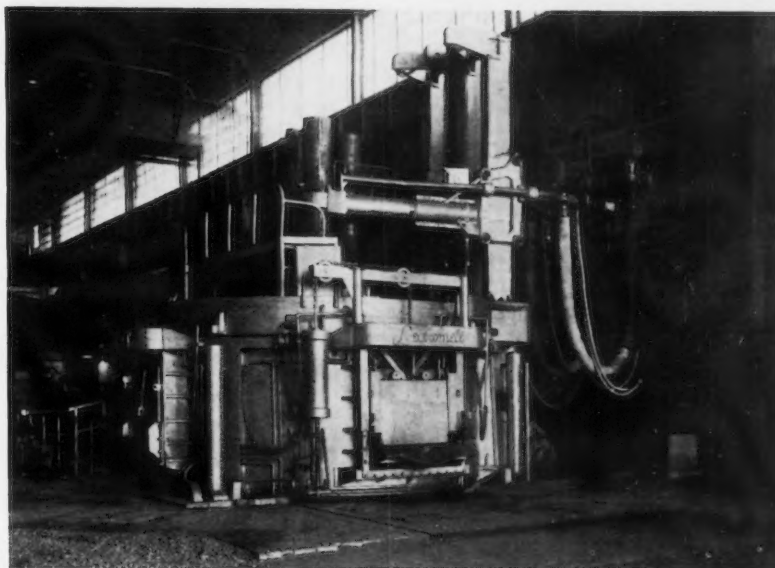
A breakdown by type of product and value in thousands of dollars follows:

		Source of Funds	
		Public	Private
Chemicals	\$412,535	\$358,593	\$53,942
Products of petroleum and coal	25,131	13,396	11,735
Iron and steel products	284,264	135,660	148,604
Ammunition, shells and bombs	404,783	366,503	38,280
Guns	231,433	208,867	22,566
Aircraft	613,748	518,092	95,656
Ships and ship repair	486,816	476,003	10,813
Vehicles and tanks	43,340	23,720	19,620
Non-ferrous metals	229,744	83,730	146,014
Machinery (except electric)	153,454	49,621	103,833
Electrical equipment	34,666	18,414	16,252
Miscellaneous manufacturing	53,538	38,252	15,286
Non-manufacturing	87,635	.....	87,635

Flying Lessons Available To 1400 Michigan Workmen

••• Winters & Crompton Corp., stamping, plating and hardware manufacturer of Grand Rapids, Mich., has begun a program of free flying lessons for employees following the signing of a contract to build airplane parts. Each pay day the 1400 employees of Winters & Crompton receive, with their pay envelopes, flying stamps which are exchanged for actual flying lessons. This employee flying program was arranged through the industrial department of Flying Stamps, Inc., Grand Rapids.

THE LARGEST TOP CHARGE ELECTRIC FURNACE IN THE UNITED STATES



LECTROMELT furnaces are built in sizes ranging from 100 tons to 25 pounds. Both door charge and top charge types are available. Rugged and durable construction. Rapid and economic operation.

PITTSBURGH LECTROMELT FURNACE CORP.
PITTSBURGH, PA.



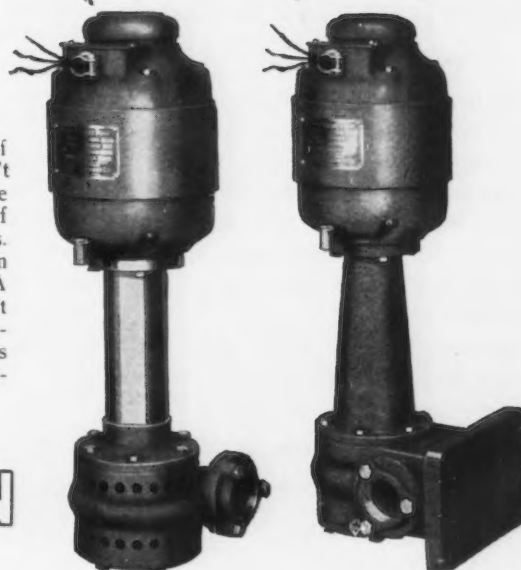
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Any Farther*

**GUSHER COOLANT
PUMP**

If you want a coolant pump of high efficiency, correctly priced, don't look any farther. Here it is—the Gusher preferred by thousands of users over all other coolant pumps.

The Gusher starts delivery when you flip the switch—no priming. A small trickle or a big flow to suit your needs. Maintenance is something you can forget because this pump has no packing, and grit particles cannot harm it.

The
RUTHMAN
Machinery Company
CINCINNATI, OHIO, U.S.A.



Experimental Glider Has Welded Frame

Minneapolis

• • • A glider for possible use by the United States Army is being built experimentally in the aeronautical engineering department of the University of Minnesota. Emphasis is placed on getting positive control at low speeds without making craft "skittish" at high speeds. Special wing and

aileron design will provide better control than is possible in most of the present gliders. Designed by Philip Stiles, engineer with Northwest Airlines, Inc., glider will have a welded frame and covered fuselage. The craft is being constructed by students in the university's aero-engineering department, under the supervision of Stiles, who has designed, built and flown many glider craft before.



Monel pickling basket, 36 x 30 x 24 inches deep. Made of 10 gauge perforated sheet, all-welded, fitted with trunnions for dumping.

BIGGER LOADS

yet FASTER HANDLING...

Change from wood to Monel brings 5 Big Benefits

This all-welded Monel pickling basket is one of five in use by Seyler Manufacturing Company, Etna, Pa. Made by Youngstown Welding & Engineering Co., of Youngstown, Ohio, it weighs only 307 lbs., yet carries loads of bolts, washers, lag screws, etc., weighing up to 2500 lbs.

Built to replace wood, these all-welded Monel baskets have shown in service 5 important advantages:

1. 10% greater load capacity with same outside dimensions.
2. Quick and easy handling in loading, transporting, and dumping.



3. Faster Pickling, due to better circulation of acid through all parts of load.
4. Rejects eliminated. Threads of heavy bolts previously became imbedded in wood, did not clean; were improperly galvanized.
5. No maintenance or loss of service during repairs.

Many plants are utilizing the advantages of Monel pickling equipment, thus speeding defense production. Write for information on Monel pickling equipment. Address:

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York, N. Y.

MONEL

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

Birmingham Payrolls Increase to 74,000

Birmingham

• • • Industrial employment and payrolls in the Birmingham district have increased from 63,056 workers earning \$66,000,000 annually in April, 1940, to 74,000 workers earning \$80,000,000 annually in June, 1941, according to figures of the Birmingham Chamber of Commerce. In May the Alabama Employment Service sent 9652 persons to jobs, the highest number of placements since the service was organized in 1933.

OPM Gives Auto, Stove Parts Priority Status

Washington

• • • Basing its action on the expectation that the defense program will make it increasingly difficult to expand or even maintain the existing supply of new durable consumers' goods, OPACS has given priority status to materials and equipment necessary to maintain the operation of passenger automobiles; trucks and tractors; household refrigerators; stoves; ranges and water heaters; plumbing fixtures; furnaces, including oil burners and stokers.

By allocating necessary material and equipment for maintenance and repair purposes of the designated commodities, OPACS gave right-of-way to this equipment over all other competing civilian demands.

Under the OPACS order "maintenance" was defined to mean the upkeep of durable consumers' goods, and the term "repair" was defined to mean the restoration of the goods to a sound state after wear and tear, damage, destruction of parts, or the like.

"These terms," OPACS explained, "include replacement of parts which have been worn out, damaged or destroyed, but do not include replacement when the new part or parts represent a change-over in model, the introduction of superior type equipment to replace usable equipment of an older or inferior type or design, or a substitution more extensive than that which is necessary to replace the part or parts that are worn out, damaged or destroyed."

British Deny Resale Of Lend-Lease Steel

Washington

••• In an interview appearing in the *Washington Post* of July 10, John Maynard Keynes, economic adviser to the British Treasury, is quoted as denying knowledge of Great Britain reexporting lend-lease supplies or their equivalent. In New York on that date, Sir Kenneth Lee, representative of the British Industrial and Export Council, commented on criticism that the British are reexporting American lend-lease material, and among other things, said that the lend-lease act, passed in March, had not been in effect long enough for such reexport. His remarks were made before members of the National Foreign Trade Council.

Keynes' attention was called by the *Post*, to a charge on the House floor by Representative James F. O'Connor, Democrat, of Montana, that American exporters are alleging that England is reselling steel and other lend-lease goods to Latin-America. O'Connor has introduced a resolution demanding a congressional investigation of the \$7,000,000,-000 lend-lease program.

The newspaper says that Keynes pointed out that figures on British exports cited by O'Connor were for 1940. The article added:

"This year," said Keynes, "the volume of our exports to South America has fallen by half and are no more than required to pay for our essential imports."

"Citing an example of a specific commodity, Keynes said that the total of British exports of iron and steel and iron and steel manufacturers to South America averaged only 6000 tons a month in the first five months of this year.

On July 14, at a British embassy press conference called to answer British export criticism, Mr. Keynes said that England has adopted a new policy toward foreign trade. Sharp restrictions, he said, have been applied to steel products in general. In her new program, he added, England would sacrifice most of her regular Latin-American trade for the duration of the war, at present sending only enough to pay for needed imports and to complete contracts to which she is already committed.

1756 Copies Sold of "Price Discrimination in Steel"

Washington

••• A tabulation submitted to the Senate by Chairman Joseph C. O'Mahoney of the defunct Temporary National Economic Committee showed this week that TNEC Monograph 41, entitled "Price Discrimination in Steel," has been in demand to the extent of 1756

copies sold by the Superintendent of Documents since its release. The report showed also that 1762 copies of Monograph No. 42 on the basing point problem had been sold to the general public.

Out of 43 monographs prepared by the anti-monopoly committee, one covering legal reserve life insurance companies proved to be "best seller."

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High Output of Rolls from FARREL ROLL GRINDERS

This illustration of the control panel of the Farrel Heavy Duty Roll Grinder shows at a glance how *centralized fingertip control* contributes to the high output of accurately ground and flawlessly finished rolls for which this machine is noted.

Without moving from his station, the operator may reach any control button or rheostat with a single movement of the arm. On a fully enclosed panel at the operator's right are located all push buttons and rheostats for the control of the several motors, with the exception of the rapid wheel feed, which is located on the operator's left next to the indexed handwheel for hand feeding of the grinding wheel. For ease in setting up a roll in the grinder, additional push buttons for controlling the

headstock motor are mounted on the headstock.

This complete *centralized fingertip control* reduces movement of the operator to a minimum; his entire attention and energy may be devoted to the work, thus assuring a continuity of output and a high daily *production with precision* which keeps roll refinishing costs at a minimum.

For full particulars of additional features which combine to give the Farrel Heavy Duty Roll Grinder its record for smooth, vibrationless performance, superior finish and high output, let us send you a copy of Bulletin No. 111. This booklet contains complete specifications and illustrated description of all features.



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Steel Output for Half Year a Record At 41 Million Tons

••• Production of steel in the record-breaking first six months of 1941 totaled nearly 41,000 net tons, or within 20 per cent of total steel production in the whole year 1917, the peak year of World War I.

Output in the first half of this year was reported at 40,911,886 tons, or nearly 40 per cent above the total of 29,405,402 tons produced in the corresponding period of 1940, according to the American Iron and Steel Institute.

In 1917, steel production amounted to 50,468,000 tons for the year. Output in the first half of 1917 was 25,235,000 tons, or 40 per cent less than production in the first half of 1941.

During the past six months the steel industry operated at an average of 98 per cent of capacity, as

compared with 72.4 per cent in the first half of 1940 and 91.6 per cent in the second half of last year.

In 1917, steel operations averaged 90.8 per cent of what was then the industry's capacity, which was approximately 55,600,000 tons annually, or one-third less than the present capacity of over 84,150,000 tons.

Steel output in June of this year totaled 6,800,730 tons, or 98.2 per cent of capacity. Production in May was 7,055,132 tons, 98.7 per cent of capacity, while in June 1940 output was 5,657,443 tons, or 84.5 per cent of capacity.

* * *

Shell Forgings To Be Made at McKeesport Tin Plate Plant

Pittsburgh

••• Jones & Laughlin Steel Corp. will furnish power, supervision, and steel, as well as the McKeesport Tin Plate plant which the company purchased last year, for the manufacture of 105 and 155

Steel Capacity Highlights

Steel production in the first half of 1941 totaled nearly 41 million net tons, or within 20 per cent of total steel production in all of 1917 the peak year of the first World War.

Light plate capacity of strip mills will be increased 754,000 tons by early 1942 through construction now under way, the OPM reports.

National Steel Corp. announces 300,000 ton increase in ingot capacity at Great Lakes plant at Detroit.

Walter S. Tower, president, American Iron and Steel Institute, tells the Association of American Railroads "the alleged shortage of steel is only on paper."

Steel plant expansion under way June, 1 involved outlay of \$284,264,000, including \$135,660,000 of government money.

mm. shell forgings. The company is now negotiating for shell orders and the government is expected to spend approximately \$4,000,000 in remodeling the former tin plate plant into an ordnance plant.

The company had previously planned on the possible use of the acquired plant for the production of galvanized sheets but this program has been shelved in favor of the national defense project. W. B. Minch, Jones & Laughlin engineering department, will be in charge of the ordnance operations.

Jones & Laughlin is also equipped at their Aliquippa works to produce shell forgings and it is understood officials of the company have now under consideration the production of shell forgings on a mass basis and possibly the manufacture of aerial bombs.

* * *

Strip Mills To Lift Plate Capacity 540,000 Tons

Washington

••• After surveying several strip mills and compiling results from questionnaires received from 13 mills, W. A. Hauck, OPM steel consultant, reports that capacity of wide strip mills to make light plates for ships, railroad cars and other purposes will be increased 754,000 tons to a total of 2,480,000 tons by early 1942. The increase in annual capacity will be made

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NEWS OF INDUSTRY

possible by construction programs under way at a number of mills. "Present total annual capacity of these mills," Mr. Hauck said,

"is 12,941,400 tons, of which 1,726,000 is light plate capacity and 11,215,400 is capacity for the manufacture of strip (used in direct

defense production and by the automobile, refrigerator and other industries). Of the additional plate capacity to be provided, 654,-

YEAR 1940										
Based on Reports by Companies which in 1940 made 98.43% of the Open Hearth, 100% of the Bessemer and 85.82% of the Electric Ingot and Steel for Castings Production										
Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	5,356,444	85.7	285,447	56.1	122,832	77.0	5,764,723	83.4	1,301,292	4.43
February	4,208,249	72.1	205,458	43.2	112,090	75.2	4,525,797	70.0	1,093,188	4.14
March	4,078,843	65.3	191,568	37.6	118,772	74.5	4,389,183	63.5	990,786	4.43
1st Quarter	13,643,536	74.4	682,473	45.7	353,694	75.6	14,679,703	72.3	1,129,208	13.00
April	3,808,031	62.9	176,419	35.8	116,024	75.1	4,100,474	61.2	955,821	4.29
May	4,583,771	73.4	258,741	50.8	125,270	78.5	4,967,782	71.8	1,121,395	4.43
June	5,222,120	86.3	305,115	61.9	130,208	84.3	5,657,443	84.5	1,318,751	4.29
2nd Quarter	13,613,922	74.2	740,275	49.5	371,502	79.3	14,725,699	72.5	1,131,875	13.01
1st 6 months	27,257,458	74.3	1,422,748	47.6	725,196	77.4	29,405,402	72.4	1,130,542	26.01
July	5,269,701	84.5	322,567	63.5	132,357	83.2	5,724,625	83.0	1,295,164	4.42
August	5,670,932	90.8	369,770	72.6	145,681	91.3	6,186,383	89.5	1,396,475	4.43
September	5,535,198	91.7	365,289	74.2	155,759	101.1	6,056,246	90.6	1,415,011	4.28
3rd Quarter	16,475,831	89.0	1,057,626	70.1	433,797	91.7	17,967,254	87.7	1,368,412	13.13
9 months	43,733,289	79.2	2,480,374	55.1	1,158,993	82.2	47,372,656	77.5	1,210,339	39.14
October	6,059,792	97.0	408,317	80.2	176,433	110.6	6,644,542	96.1	1,499,897	4.43
November	5,872,162	97.1	420,448	85.3	176,497	114.2	6,469,107	96.6	1,507,950	4.29
December	5,907,840	94.8	399,434	78.6	188,083	118.2	6,495,357	94.1	1,469,538	4.42
4th Quarter	17,839,794	96.3	1,228,199	81.3	541,013	114.3	19,609,006	95.6	1,492,314	13.14
Total	61,573,083	83.5	3,708,573	61.7	1,700,006	90.3	66,981,662	82.1	1,281,210	52.28

Note—The percentages of capacity operated are calculated on weekly capacities of 1,410,130 net tons open hearth, 114,956 net tons Bessemer and 36,011 net tons electric ingots and steel for castings, total 1,561,097 net tons; based on annual capacities as of Dec. 31, 1939 as follows: Open hearth 73,721,592 net tons, Bessemer 6,009,920 net tons, electric 1,882,630 net tons.

YEAR 1941										
Based on Reports by Companies which in 1940 made 98.43% of the Open Hearth, 100% of the Bessemer and 85.82% of the Electric Ingot and Steel for Castings Production										
Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,271,862	99.0	451,637	76.0	205,256	93.4	6,928,755	96.9	1,564,053	4.43
February	5,673,289	99.2	378,330	70.5	186,281	93.9	6,237,900	96.6	1,559,475	4.00
March	6,461,936	102.0	460,169	77.4	209,536	95.4	7,131,641	99.7	1,609,851	4.43
1st Quarter	18,407,087	100.1	1,290,136	74.8	601,073	94.2	20,298,296	97.8	1,578,406	12.86
April	6,130,638	99.9	395,009	68.6	232,081	109.1	6,757,728	97.6	1,575,228	4.29
May	6,360,211*	100.4*	444,361	74.8	250,560	114.0	7,055,132*	98.7*	1,592,581*	4.43
June	6,103,767	99.5	458,242	79.6	238,721	112.2	6,800,730	98.2	1,585,252	4.29
2nd Quarter	18,594,616	99.9	1,297,612	74.3	721,362	111.8	20,613,590	98.2	1,584,442	13.01
1st 6 months	37,001,703	100.0	2,587,748	74.5	1,322,435	103.1	40,911,886	98.0	1,581,441	25.87
July										4.42
August										4.43
September										4.28
3rd Quarter										13.13
9 months										39.00
October										4.43
November										4.29
December										4.42
4th Quarter										13.14
Total										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons Bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Dec. 31, 1940 as follows: Open hearth 74,565,510 net tons, Bessemer 6,996,520 net tons, electric 2,586,320 net tons.

* Revised

Printed in U.S.A.

000 tons will be obtained gradually by the end of this year and the other 100,000 will be available by March 1, 1942.

"Light plate production on the strip mills in May, 1941, was 108,772 tons. For the first five months of 1941 it averaged 97,013 tons per month, compared with a current capacity of 143,833 per month. This average unused capacity of 46,820 tons is to be absorbed gradually by the reallocation of suitable orders for light plates and the placing of new orders."

All steel companies with strip and plate capacity will be requested by the OPM shortly to reallocate to strip mills, plates which are now scheduled for the regular plate mills in cases where the sizes and quantities are better suited for strip mill production. Present plan is to allocate to strip mills in the best position to produce such plates all new orders for light plates of sizes and quantities suitable for strip mill production. This arrangement is expected to relieve the heavier plate mills of a substantial amount of the light plate tonnage more suitable for strip mills and at the same time enable them to concentrate on heavier plate orders.

Some companies with strip mills are installing additional heavier plate capacity and companies not operating strip mills are installing more plate capacity. In addition, the projected overall expansion of the steel industry under consideration contemplates further plate capacity.

Mr. Hauck reported that most of the plates rolled on strip mills are $\frac{5}{8}$ in. or less, although four of the strip mills can also roll $\frac{3}{4}$ in. plates. Since strip mills are geared for speed with little interruption, large tonnages in uniform sizes as to length, width and thickness must be scheduled in order to obtain maximum production of light plates on strip mills.

Great Lakes Steel To Lift Capacity by 300,000 Tons

Pittsburgh

• • • A new expansion program to be started at National Steel Corp.'s Detroit unit, Great Lakes Steel Corp., will increase steel ingot capacity of the corporation 300,000 tons, according to E. T. Weir, board chairman. The new

program includes the installation at Detroit of a bessemer converter and expansion of open-hearth furnace capacity.

With this latest program and including installation now going on at the Weirton Steel Co., National Steel's ingot capacity will be increased by 750,000 tons or 21 per cent more than the ingot capacity at the end of 1940. According to Mr. Weir, the expansion is being undertaken to meet increased defense needs and he added that the major portion of National Steel's output is being applied in defense production.

Also under way at Great Lakes Steel Corp. is the adapting of the company's 96 in. continuous hot mill for the annual production of from 300,000 to 350,000 net tons of steel plates.

The entire National Steel program now in progress at its three units, and which will be largely completed this year, includes the construction of 45 new by-product coke ovens and the building and enlarging of blast furnace capacity to add more than 600,000 net tons per year to pig iron production.

ICC Denial Asked of L. & N. Steel Rate Cut

Washington

• • • A report proposed by Examiner William B. Wilbur recommends that the Interstate Commerce Commission deny an application of the Louisville & Nashville Railroad to establish a rate of 18c per 100 lb. on building sheet material work, in straight or mixed carloads, minimum weight 70,000 lb. from Newport, Ky., to Memphis, Tenn. The present rate is 47c., minimum 30,000 to 40,000 lb., according to commodity. The purpose of the relief sought was to enable the rail carrier to compete for this iron and steel traffic, all of which is adapted to transportation by barge and now moves exclusively that way from Newport to Memphis.

In proposing that the application be denied, Examiner Wilbur pointed out that if the rate of 18c. were established from Newport and the present rate of 47c. were left in effect from Cincinnati it would create a differential of 29c.

in favor of Newport and result in a situation which would be difficult, if not impossible to defend as a violation of the Interstate Commerce Act.

Changes in Design Won't Affect Quality, Ford Says

Detroit

• • • Ford Motor Co. is on record through R. H. McCarroll, Ford metallurgist, as stating that there will be no reduction in the quality of its cars, regardless of changes in specifications made necessary by restrictions in the use of metals essential to the defense program.

The probabilities are that the weight of the cars will be increased slightly, but this increase will not be large enough to affect gasoline economy in the slightest. The increase in weight will be less than 5 lb. in the case of the Ford and Mercury cars, and not more than 20 lb. in Lincoln cars.

The only other effects of the changed design will be that cars will cost somewhat more to produce, Mr. McCarroll said. He indicated definitely that the carburetor bowl would be changed from zinc die castings to cast iron, that nickel will be eliminated from the steel used for valves and their weight slightly increased, that the instrument panel will be changed to a plastic.

3413 Aluminum Workers Lose Jobs Due to Shortage

Washington

• • • More than 3413 persons, or about 20 per cent of all the employees of the aluminum cooking utensil industry have been laid off or have quit their jobs as a result of the industry's inability to obtain aluminum for non-defense products, the Office of Production Management announced last week.

Possibilities of converting these plants to defense production was discussed at a conference attended by representatives of several aluminumware companies, the Aluminum Ware Association and representatives of various Government agencies.

Steel Plate Output Rises to 101% in May, Sheets Relatively Lower

••• Steel plate production during May rose sharply to 101 per cent of capacity, from 88 per cent in April, as a consequence of increased demand for plates for ships, railroad cars and other defense uses.

At the same time sheet and strip mills rolling a higher production of orders for commercial use, did

not make a corresponding gain with sheet output at 100 per cent, compared to 108 per cent in April. (Production of one large manufacturer was not included in the May figures).

Plates produced during May totaled 472,356 net tons, against 446,653 tons in April, while sheet mills, according to the American

Iron & Steel Institute, rolled 1,032,732 net tons in May compared to 1,166,873 tons in the preceding month. During the first five months of 1941, sheet production averaged 101 per cent.

Total of steel products for sale in May was 5,196,563 net tons, compared with 5,269,748 tons in April.

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

MAY - 1941

PAGES

	Number of companies	Items	Annual Capacity Net tons	PRODUCTION FOR SALE—NET TONS							
				Current Month				Year to Date			
				Total	Per cent of capacity	Export	To members of the industry for conversion into further finished products	Total	Per cent of capacity	Export	To members of the industry for conversion into further finished products
Ingots, blooms, billets, slabs, sheet bars, etc.	34	1	xxxxxxx	425,762	xxx	20,370	179,822	2,472,243	xxx	622,919	754,493
Heavy structural shapes	7	2	4,730,200	398,497	99.2	11,739	xxxxxxx	1,828,733	93.4	81,125	xxxxxxx
Steel piling	3	3	248,000	24,977	118.5	691	xxxxxxx	104,812	102.1	11,612	xxxxxxx
Plates—Sheared and Universal	18	4	5,496,590	472,356	101.1	24,028	2,512	2,199,804	96.7	176,729	10,994
Skelp	8	5	xxxxxxx	91,949	xxx	19,165	33,299	441,071	xxx	69,349	180,499
Rails—Standard (over 60 lbs.)	4	6	3,613,600	169,348	55.2	755	xxxxxxx	776,124	51.9	32,144	xxxxxxx
Light (60 lbs. and under)	6	7	302,800	13,961	54.3	4,913	xxxxxxx	80,957	64.6	31,751	xxxxxxx
All other (Incl. girder, guard, etc.)	2	8	102,000	2,115	24.4	114	xxxxxxx	9,827	23.3	1,499	xxxxxxx
Splice bar and tie plates	14	9	1,210,600	72,315	70.3	1,367	xxxxxxx	318,157	63.5	8,333	xxxxxxx
Bars—Merchant	34	10	xxxxxxx	520,968	xxx	25,676	62,985	2,599,034	xxx	250,043	299,560
Concrete reinforcing—New billet	15	11	xxxxxxx	135,255	xxx	19,727	xxxxxxx	589,723	xxx	96,963	xxxxxxx
Re-rolling	17	12	xxxxxxx	22,057	xxx	1,427	xxxxxxx	67,871	xxx	4,913	xxxxxxx
Cold finished—Carbon	19	13	xxxxxxx	108,374	xxx	1,416	xxxxxxx	507,082	xxx	9,311	xxxxxxx
Alloy—Hot rolled	15	14	xxxxxxx	143,678	xxx	12,607	14,089	656,222	xxx	63,206	65,164
Cold finished	16	15	xxxxxxx	17,895	xxx	2,016	xxxxxxx	79,854	xxx	9,872	xxxxxxx
Hoops and baling bands	5	16	xxxxxxx	10,381	xxx	234	xxxxxxx	43,018	xxx	1,690	xxxxxxx
TOTAL BARS	52	17	11,600,185	958,608	97.3	63,103	77,074	4,542,804	94.6	435,998	364,724
Tool steel bars (rolled and forged)	16	18	127,870	9,745	89.7	572	xxxxxxx	45,496	86.0	3,352	xxxxxxx
Pipe and tube—B. W.	13	19	2,049,200	134,986	77.5	12,907	xxxxxxx	640,698	75.5	51,533	xxxxxxx
L. W.	8	20	885,260	41,311	54.9	3,050	xxxxxxx	197,304	53.9	14,044	xxxxxxx
Electric weld	4	21	466,020	46,458	117.3	7,981	xxxxxxx	175,908	91.2	11,370	xxxxxxx
Seamless	15	22	3,003,840	182,765	71.6	17,029	xxxxxxx	858,910	69.1	80,950	xxxxxxx
Conduit	6	23	152,145	11,719	90.7	263	xxxxxxx	55,881	88.7	934	xxxxxxx
Mechanical Tubing	12	24	461,725	43,983	112.1	3,301	xxxxxxx	196,107	102.6	19,367	xxxxxxx
Wire rods	19	25	xxxxxxx	126,962	xxx	11,255	21,423	637,457	xxx	69,060	109,295
Wire—Drawn	37	26	2,291,250	199,747	102.6	12,638	1,922	904,978	95.4	64,890	9,456
Nails and staples	19	27	1,120,610	68,236	71.7	7,477	xxxxxxx	346,653	74.7	29,859	xxxxxxx
Barbed and twisted	16	28	458,210	24,382	62.6	6,532	xxxxxxx	119,320	62.9	27,527	xxxxxxx
Woven wire fence	15	29	771,180	28,991	44.2	106	xxxxxxx	140,730	44.1	917	xxxxxxx
Bale ties	10	30	110,980	8,535	90.5	59	xxxxxxx	32,088	69.9	99	xxxxxxx
All other wire products	5	31	24,280	659	31.9	-	xxxxxxx	2,655	26.4	-	xxxxxxx
Fence posts	13	32	136,195	6,970	60.2	58	xxxxxxx	30,431	54.0	479	xxxxxxx
Black plate	10	33	296,435	40,135	159.4	7,350	35	152,609	124.4	11,540	42
Tin plate—Hot rolled	7	34	352,700	27,209	90.8	3,026	xxxxxxx	111,499	76.4	7,567	xxxxxxx
Cold reduced	9	35	3,061,440	217,150	83.5	20,247	xxxxxxx	919,222	72.5	75,956	xxxxxxx
Sheets—Hot rolled	23	36	xxxxxxx	599,104	xxx	24,913	18,197	2,860,321	xxx	150,589	88,676
Galvanized	13	37	xxxxxxx	133,253	xxx	8,442	xxxxxxx	714,490	xxx	52,702	xxxxxxx
Cold rolled	15	38	xxxxxxx	237,413	xxx	4,390	xxxxxxx	1,185,974	xxx	21,478	xxxxxxx
All other	13	39	xxxxxxx	62,953	xxx	1,668	xxxxxxx	311,883	xxx	9,083	xxxxxxx
TOTAL SHEETS	26	40	12,137,550	1,032,723	100.1	39,413	18,197	5,072,668	101.0	213,862	88,676
Strip—Hot rolled	22	41	2,666,140	160,839	71.0	4,765	21,833	765,080	69.3	27,720	104,023
Cold rolled	33	42	1,258,700	99,419	93.0	972	xxxxxxx	468,193	89.9	4,711	xxxxxxx
Wheels (car, rolled steel)	5	43	422,825	22,026	61.3	87	xxxxxxx	105,864	60.5	238	xxxxxxx
Axles	4	44	472,280	13,374	33.3	500	xxxxxxx	71,664	36.7	882	xxxxxxx
Track spikes	10	45	319,435	14,993	55.2	129	xxxxxxx	71,964	54.4	1,418	xxxxxxx
All other	4	46	24,100	3,358	164.0	-	xxxxxxx	9,489	95.1	79	xxxxxxx
TOTAL STEEL PRODUCTS (a)	133	47	xxxxxxx	5,196,563	xxx	305,963	356,117	24,907,500	xxx	2,189,804	1,622,202

Pig iron, ferro manganese and spiegel	23	48	xxxxxxx	581,304	xxx	46,927	157,847	2,972,665	xxx	225,767	885,247
Ingots	4	49	xxxxxxx	62,481	xxx	591	xxxxxxx	301,644	xxx	1,153	xxxxxxx
Bars	9	50	109,195	5,716	61.6	7	364	25,786	57.1	16	1,413
Pipe and tubes	3	51	109,300	6,223	67.0	530	xxxxxxx	26,721	59.1	889	xxxxxxx
All other	2	52	71,000	1,035	17.2	-	-	7,799	26.5	1,181	-
TOTAL IRON PRODUCTS (ITEMS 50 to 52)	11	53	224,995	12,974	67.9	537	364	60,306	64.8	2,086	1,413

Total Number of Companies
Included - 150.

(a) Reported by 133 Companies, which in 1940 produced 91% of that Year's Total Output of Finished Rolled Products.

The estimated average yield of products for sale from ingots produced by the companies included above is 71.1%, which applied to their total ingot capacity equal 54,980,400 net tons of finished rolled products. Production for sale, less shipments to members of the industry for further conversion, related to the estimated yield is as follows:

Current month 4,840,446 N.T.: 103.6 %
Year to date 23,285,298 N.T.: 102.3 %

U. K. Scrap Trade Puzzled by Imports

London

• • • Placing of an order by the British Government for the purchase from the United States of between 350,000 and 400,000 tons of iron and steel scrap has attracted considerable interest in the British trade. No details as to price or methods of delivery are available, nor is it known whether the material will be treated as supplies reaching Britain under the Lease-Lend Act.

Some perplexity has been caused in trade circles by the continued policy of importing scrap, when such huge supplies are known to exist in the United Kingdom. However, two good reasons are advanced for this policy: (1) That it may be the policy of the authorities to encourage the use of greater amounts of scrap in the manufacture of steel goods, thus saving imports of iron ore, which take up far more shipping space than scrap, and (2) that by making use of a ship which can call at ports serving several industrial districts with its supplies an important economy of transport can be effected.

It is believed that up to 70 per cent of scrap may be used in the manufacture of steel, the balance being iron ore and other ingredients. By maintaining scrap imports at a high level, too, Britain's existing stocks can be preserved. As eventually it may not be possible to allow so much space for scrap, it is undoubtedly in the interests of the steel trade to get as much into the country as possible while the shipping space is available.

Ceiling for Cast Scrap Established in Canada

Toronto

• • • Maximum prices on cast iron scrap have been established by the Canadian Department of Munitions and Supply, following negotiations with the Canadian Founders and Metal Trades Association and the Canadian Secondary Materials Association. The Steel Controller's order and the maximum prices

established for cast scrap are as follows:

"In order to stabilize prices for cast iron scrap and ensure a steady flow to foundries to meet their requirements for war purposes and essential industries, the Steel Controller hereby orders that on and after July 10, 1941, prices not exceeding those shown hereunder shall be paid in the Provinces of Ontario and Quebec for cast iron scrap delivered consumers' plants."

Canadian Maximum Prices

(Per Gross Ton)

	Ontario Consumers	Quebec Consumers
No. 1 machinery cast.	\$22.00	\$23.00
No. 2 cast.	21.00	22.00
Automobile cast	21.00	22.00
Plow points, chilled		
cast, white iron	20.00	21.00
Stove plate	18.00	19.00

For breaking scrap which can be done by drop into No. 1 machinery cast, the maximum price which may be paid by consumers shall not exceed \$1.50 per gross ton below the price of No. 1 machinery cast.

All new purchase contracts entered into on and after July 10, are to be on a basis not exceeding the ceilings, and all existing contracts at higher prices, where shipment has not been completed within 30 days from that date are to be canceled in respect to the unshipped portion.

The new prices do not apply to imported scrap. Canadians making scrap purchases in the United States have been asked to use care so as not to disrupt the situation across the line by too persistent bidding or offering prices high above the prevailing U. S., fixed prices.

Arthur G. McKee to Build National Tube Blast Furnace

Cleveland

• • • Arthur G. McKee & Co., engineering firm with headquarters here, will design and build the new 1100-ton blast furnace which National Tube Co. will erect at Lorain, Ohio. (IRON AGE, July 10, page 127.) The unit will replace a stack of 750-ton daily capacity which is in operation at present. The contract runs well over a million dollars. The McKee company not long ago completed a similar new stack at the Lorain works for National Tube.

U.C.C. To Operate New Aluminum Plant

Washington

• • • Union Carbide & Carbon Co., long prominent in the iron and steel industry, will build and operate an aluminum plant, the Office of Production Management disclosed Monday. Union Carbide & Carbon's venture into the aluminum field is part of the OPM's plan to increase the nation's aluminum production capacity by 600,000,000 lb. a year. Four other companies, including Bohn Aluminum & Brass Co., Reynolds Metals Co., Olin Corp. and the Aluminum Co. of America were named as operators of the seven new aluminum plants to be built with government funds. The operators, plant sites and capacities recommended by OPM to the War Department as follows:

Aluminum Co. of America; one Arkansas plant of 100,000,000-lb. capacity, one at Messena, N. Y., of 150,000,000-lb. capacity and one in the Bonneville-Grand Coulee area of 90,000,000-lb. capacity.

Union Carbide & Carbon Co., one plant at Spokane, Wash., with 60,000,000-lb. capacity.

Reynolds Metal Co., a plant at Lister, Ala., with capacity of 100,000,000.

Bohn Aluminum & Brass Co., one plant at Los Angeles with 70,000,000-lb. capacity.

Olin Corp., a plant at Tacoma, Wash., with capacity of 30,000,000 lb.

It was also announced that the Aluminum Co. of America would operate a government-owned plant at an undisclosed site for the production of 400,000,000 lb. of alumina annually. This plant will be the first designed for the combined treatment of both high grade and low grade ores.

Philip Murray Stricken

Pittsburgh

• • • Philip Murray, president of the CIO and of the Steel Workers' Organizing Committee, was stricken with a heart attack while playing badminton at a picnic near here last Sunday.

Stainless Steel

(CONTINUED FROM PAGE 47)

sonably strong and very stable up to 1650 deg. F., and at higher temperatures are inferior only to 25 Cr-20 Ni steel. They are, therefore, very useful for many furnace fittings and parts working at high temperatures but under moderate load—they can, however, carry good loads up to 1650 deg. F.

Of great interest and value, also, are the metallurgical investigations being carried out to adapt stainless steel to the rigors of aircraft construction. An excellent article on various phases of this problem appeared in *THE IRON AGE*, Jan. 30, 1941. It is really tragic that stainless bombers are today not in production, what with the aircraft program suffering already from an aluminum shortage.

It has been a general observation that by taking advantage of the instability of austenitic alloys of various compositions, very high values for tensile strength and in certain cases for elastic properties can be obtained—but, of course, with some sacrifice in ductility or similar properties. Quite recently, a more precise analysis of the problem, namely the investigation of various factors exerting their influence upon the processes of decomposition of austenite has been attempted, but the industry still possesses only a very limited knowledge as to these many factors. It is increasingly obvious that there is a pressing necessity for fundamental studies in this general direction.

Experimental results, showing the extraordinary influence of the composition, have disclosed the part played by various elements found in stainless austenitic alloys. These elements are Cr, Ni, Mn and C. By proper selection of concentrations, and ratio of one element to the other, these alloys may be processed to a given tensile strength and yet have other mechanical characteristics of the alloy varied within very wide limits.

Increase (or decrease) in an element, as for instance chromium, will have a certain tendency only up to a certain amount of that element. Increasing it still further may reverse the tendency.

Ductility can often be interpreted in terms of ability toward various

forming operations. In many problems involving such specific processes as deep drawing, stamping, etc., it is, therefore, imperative to select an alloy in which chromium, nickel, manganese and carbon, are present in a definite proportion.

According to V. N. Krivobok, of Lockheed Aircraft, this is of inestimable value in aircraft structures where the optimum in mechanical properties to overcome the handicap of increased weight must be accompanied by workability, i. e., ability to be formed into complex curvatures with a minimum in spring back. Such compositions have been determined and the aircraft industries now have these data at hand.

Further, it should be stressed that the alloy analysis must be selected according to the application for which intended. If a material is desired for structural parts of aircraft where high physical properties are paramount, then an 18-8 or 17-7 analysis would be chosen, depending on whether the steel is below or above the half-hard range. However, if good deep drawing characteristics are desired, then a composition would be selected which could be most easily worked with minimum hardening, such as the fully austenitic alloys of the 18-10 type. The above, of course, is not specific bible talk, but is a generalization of a rather complex subject, and each individual application requires an individual diagnosis.

Recent investigations, as yet unavailable to many industries, show that today's concepts of ductility and formability are to undergo considerable changes. Proper selection of the forming tools, directed flow of metal under combined (complex) stresses show that alloys, both ferrous and non-ferrous, possess greater ductility than that generally realized.

The individual influence of the alloying elements—dependent also upon various combinations of said elements—on the mechanical properties of the alloys may be generalized as follows, stated in regard to the "stability" of alloys rather than in terms of mechanical properties: (A) the stability is increased by increasing total alloy content; (B) for a given Cr content the stability is increased with an increase in either Ni or Mn content; and (C) the influence of Cr in alloys with constant Ni is quite

complex. Generally speaking, the maximum in tensile properties is obtainable in alloys of least stability.

The use of the word "stability" does not portray, however, the expected properties of the alloy. For example, for a given Cr and Ni content (say 18 and 8 per cent, respectively) increasing carbon will permit obtaining greater ductility for a given tensile strength.

Certain combinations of Cr on the high side (19 per cent or so) and nickel on the low side (below 7 per cent) and with properly chosen carbon content (0.10 to 0.11 per cent) will yield almost extraordinary properties insofar as high tensile and high ductility are concerned.

The foregoing about sums up the metallurgical shifts of the past year. In actual production technique, the commercial success of the Pluramelt process developed by R. K. Hopkins was undoubtedly one of the most significant developments. This procedure, as exploited in a full-size machine at the Brakenridge plant of the Allegheny Ludlum Steel Corp. faces (or, the company prefers the term armors) carbon steel ingots with any type of stainless or heat-resisting alloy. This dual ingot may be reduced by conventional means to strip, sheet or plate, the alloy facing normally constituting about 20 per cent of the thickness. However, the alloy surface may be thin or thick, placed on both sides, or about anything desired. Considerable success has attended the production of Pluramelt wire and bar billets, and commercialization in such a direction is looked for when war work disappears.

In the first description of the Pluramelt machine (*THE IRON AGE*, March 6, 1941), it was shown how the Hopkins machine is essentially a carefully controlled, mobile electric furnace, producing alloy under a slag blanket continuously from raw materials fed into the melting and refining cavity continuously and in carefully metered quantities. A full-size carbon steel ingot (or it could be an ingot of practically any analysis) is placed in the Pluramelt machine so that a 2-in. or so space is left between the ingot face and the mold wall of the machine. A special head carrying electric arcs is lowered into this cavity, tubes bring properly proportioned ingredients (fer-

rochrome, nickel, manganese, etc.), into this same cavity, slag constituents are added by hand, and the machine is set in operation. As the head moves slowly and automatically up the side of the ingot, a continuous pool of alloy of any desired analysis is cast alongside and integral with the ingot. All the iron constituent of the alloy comes from the portion of the ingot melted.

Pluramelt alloy is every bit as good as material conventionally made. The method of manufacture permanently joins the base and alloy facing, and there is no separation during the most severe fabrication. Considerable quantities of this material are now being used. The machine is also being employed to some extent for the making of two-alloy armor plate and to a lesser extent for die steels.

Another manufacturing development yet in its infancy in this country is the extrusion of stainless steel rods and tubes. This practice has been widely applied abroad (as has also the extrusion of carbon steel), but any number of American companies have only made tentative experimental jabs in such a direction. Most of the recent work done here has been carried out by Babcock & Wilcox, using the large extrusion press at Bridgeport Brass Co. plants. Results to date have been very encouraging.

Since most stainless alloys are high priced, and also since certain analyses do not work well by rolling, welding or piercing, it is well understood why certain characteristics of extrusion would be viewed favorably. Inasmuch as extrusion is a squeezing-compression operation (while rolling or drawing is a stretching operation primarily) the final product often has a grain structure more free from faults than if it had been rolled. In extrusion, a rough cast billet is the starting point, and the final product is formed of clean material only, the skin of the billet remaining in the machine. The amount of scrap—consisting of the thin shell of the billet which is the discard—is very low, so that the difference in weight of the billets charged into the container and the extruded product is often about 8 to 10 per cent in the case of tubes, and only about 10 to 12 per cent when manufacturing rods. Concentricity of tubes, using sound billets and uni-

formly heated, can be in the neighborhood of 5 per cent of the wall thickness.

There have been several other developments in the production of stainless tubing. For instance, Summerill Tubing Co. is experiencing great success with the Rockrite tube reducer for heavy reductions, in place of the conventional draw bench. The Rockrite machine has had considerable acceptance in the non-ferrous field, but heretofore has been employed very little in the ferrous field. Of great interest, also, is the machine just developed by the Yoder Co. for continuously gas welding (oxy-acetylene) strip into tubing at such high speeds as 40 to 50 ft. per min. Atomic hydrogen has hitherto been the usual practice, with speeds on the order of 15 ft. per min.

The most popular experimentation in stainless steel, or at least the one accorded the most widespread attention, is that dealing with the permanent coloring of the various alloys. Developments along this line have been mentioned in the past reviews, and the following information should serve to bring the subject up to date.

Efforts of Oscar Bach to color stainless alloys have been mentioned in a special article (*THE IRON AGE*, April 6, 1939), and the only recent application is that of the mural spanning the three-story-high entrance to the Airline Terminal at Pershing Square in New York. The mural is a huge map of the world—the oceans in black, the continents in silver, and with key airports of the world—such as Midway Isles, the Azores, New York—marked by figures of gold colored steel.

Of significance far beyond the aesthetic appeal, however, is the Coloron process developed by Clements Batcheller at Watervliet, and controlled by Allegheny Ludlum Steel Corp. This procedure is showing promise in directions not first anticipated.

First conceived as a decorative color method for alloy steels containing 6 per cent or more chromium, the oxide surface coloring of Coloron ranges from light brass gold, bronze gold, deep bronze gold, black, deep blue, navy blue, into maroon and green—these colors come in the order named, depending on the length of time in the bath, temperature and voltage applied, etc. The time might vary

from 22 to 45 min. The basic electrolyte is a high concentration sulphuric acid and water, to which is added bichromate salt. The sulphuric acid concentration is usually about 50 per cent by volume, and the operating temperature is in the neighborhood of 185 to 200 deg. F.

The next step in Coloron was to place decorative designs on a pre-colored stainless and then remove any portion electrolytically to produce the ultimate design in the original metal finish—or the specimen may be further treated to produce the design in high relief etch figure wherein the etched area may have the brightness that is so characteristic of chrome plate or have a soft sheen almost like silver or anodized aluminum.

Recently, however, great promise has been shown for using colored stainless in improving the art of lithographic printing. It is possible to produce types of printing masters or plates which are virtually indestructible in printing life, as compared with the more limited life of zinc or aluminum plates. This process, wherein usually the colored or oxidized surface is left in relief in the design desired and used as a printing surface, has been developed to such a point where it covers practically the entire range of such types of printing as photo-offset, intaglio plates, high relief letter press, deep etched plates, etc. For the general lithographic field a yearly consumption of 20,000 to 24,000 tons of zinc and aluminum plates is current practice, with aluminum accounting for about 40 per cent of the total. It is stated that a transference of this tonnage to stainless steel is within reason.

The Coloron finish, considered from the aesthetic viewpoint, can be quite rich and deep in color, and is integral with the surface. The resistance of the coating to mechanical abrasion is only so-so, for the color can be removed by hard rubbing with emery. Very important is that the coloring does not reduce the corrosion resistance of the stainless alloys, and in some cases actually improves the resistance. An example of this is the large stainless part on the Garand rifle which is colored for several reasons, one being to improve resistance against gas corrosion.

Another development in the stainless field is the application of various rolled-in decorative finishes

on strip and sheets. A plant at Ambridge, Pa., by Rigid-Tex Corp., was planned to take steel from producers and roll in various designs at a cost approximating the cost of a No. 4 finish, and then ship the material to the customers. Such service could be quite useful, although a crimp has been put in the enterprise because of concentrated attention of the industry on war work.

Raw Material Situation

Three critical products are involved in stainless manufacture—scrap, chromium, and nickel. Chromium has just been put on a strict priority basis, and users in this country have on the order of almost a year's supply on hand, based on current consumption. Very few sources of chrome ore have been cut off so far by the war. The excellent metallurgical material from Turkey is now practically out of the picture, however. For some time Turkey has been shipping its ore approximately 1200 miles by rail to Basra and recent deliveries there have been laid down at about \$20 a ton. The United States Government recently brought in a shipment from that point, supplying the ships and paying the freight, and the ore cost about \$60 a ton laid down in this country. This is pretty high priced ore even for these times.

Naturally it is the freight situation that is driving up chrome ore prices and there is certainly nothing in the picture to alleviate this situation. The freight rate from South Africa is now about \$20 a ton, and if the Germans should take Dakar, undoubtedly this rate will mount rapidly and insurance will become almost prohibitive. The conference rate from India is about \$20 but the actual rate is in the neighborhood of \$35 a ton. This whole question of rates is rather secretive. There is frequent talk about asking rates but nobody is inclined at the moment to give definite figures on closing rates.

As already mentioned, Turkey is the only high grade producer that so far needs to be written off. Ex-

cellent metallurgical ore (53 to 56 per cent Cr_2O_3) about the best in the world, is still available from New Caledonia which, much to the relief of many people in this country, is now under the jurisdiction of de Gaulle rather than Vichy. The excellent metallurgical ore from Baluchistan Province in India is still coming in rather freely. The South African ore, which is of nearly normal metallurgical grade, is also coming in as freely as ship facilities permit. In Brazil there is an enormous undeveloped field of rather low grade ore quite suitable for concentration, however, which unfortunately is located 400 miles inland with no rail facilities. As soon as this field is opened up as regards transportation, it is likely that this country will draw upon that section to a considerable extent. There has been a recent offer in this country of Brazilian ore but most importers are rather skeptical as to whether it is actually at tidewater.

Those two islands, Cuba and the Philippines, are showing far greater promise than had heretofore been expected as regards various ores, of which chrome ore is now receiving considerable attention. In Cuba there is at least one property with about a million tons of 30 to 36 per cent chrome, although this material is mostly of refractory grade and shows no great promise for metallurgical purposes. Philippine reserves are also large—the chrome ore running about 2.6 to 1 in Cr-Fe ratio, which is somewhat under the standard metallurgical level. It would not be too difficult, however, to use this for metallurgical purposes and, in fact, several companies in this country are already blending this ore with richer grades.

Although there are chrome ore fields in Alaska, one of which received great attention some time ago during the bidding for the government ore reserve, this situation has quieted considerably. This field (has a 3:1 Cr-Fe ratio) will very likely be opened up in 1942, and should turn out 50,000 tons

yearly. The Canadian company making Chrome-X originally conceived this material as an outlet for low grade Canadian and American ore. However, so far this material is being made primarily from imported ore and will likely continue so until imported ore runs over \$35 a ton.

It thus appears that if the stainless steel industry even doubles in 1941 the record level established in 1940, the chrome ore situation may not be too severe a deterrent. It will take some ingenuity to handle some of these more readily available ores. Perhaps the transportation situation will get extremely precarious. Nonetheless, the stocks on hand are sufficient to cushion some of these more severe shocks.

Regarding nickel, the situation has been pretty well publicized. No nickel is available for steels used in non-defense industries. With priority ratings, however, nickel is even today fairly readily available. Large percentages of stainless are now used in defense industries and over the next year this volume will likely double, that is, it will double if sufficient nickel is available. At the present writing it is impossible to say whether this additional drain on nickel can be fully met. On the other hand, it has already been described how various analyses are being developed, which require little or no nickel.

Scrap material is none too plentiful, but the situation at the moment is not particularly serious. The major role of scrap will be its enforced re-use to regulate the amount of new materials going into each heat of alloy. The Government just recently made an attempt to force the use of sufficient scrap in each heat to take care of 60 per cent of the nickel requirement, but producers found this practice a little too stiff. The regulation has been withdrawn and a new one is being whipped up. Just what the next year will bring in scrap is beyond the vision of anyone at the moment, and all those involved are keeping their fingers crossed and hoping for the best.

- **Edmund R. Walker**, formerly manager of the air-conditioning division of the Fedders Mfg. Co., Buffalo, has been promoted to assistant general manager of the company. He has had broad experience in engineering, designing, manufacturing and marketing.

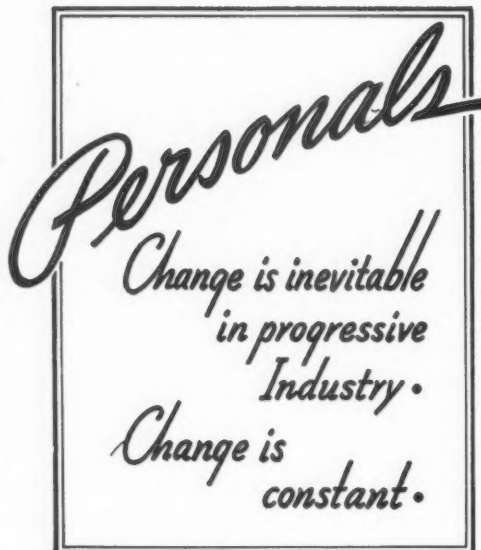
- **Herbert J. Watt** has been appointed manager of sales for the Western area by Carnegie-Illinois Steel Corp. He will coordinate sales activities of Carnegie-Illinois offices at Chicago, Denver, Detroit, Indianapolis, Milwaukee, St. Louis and St. Paul. He will make his headquarters at the corporation's Chicago office. Mr. Watt began his steel industry experience at the Philadelphia office of the Carnegie Steel Co. in 1912. He was assistant general manager of sales of Jones & Laughlin Steel Corp. before joining Carnegie-Illinois in 1939 as manager of sales for the Central area.

- **Thomas F. Peterson**, since 1937 director of electrical cable works at Worcester for the American Steel & Wire Co., Cleveland, has been appointed director of electric cable engineering and research, with headquarters in Cleveland. He joined the New York office of the company in 1927.

- **C. W. Pearsall**, who joined the Ahlberg Bearing Corp., Chicago, in 1919, has been appointed general sales manager. He has been



EDMUND R. WALKER, assistant general manager of Fedders Mfg. Co.



successively salesman in the Chicago and Philadelphia offices of the company, later becoming branch manager of those two offices.

- **J. M. Manley, Jr.**, has been made personnel director of the Lodge & Shipley Machine Tool Co., Cincinnati. He resigned as secretary of the Industrial Association of Cincinnati, the Cincinnati branch of the National Metal Trades Association and the Associated Foundries of Cincinnati. He had served as secretary of the three organizations for more than 10 years and has a wide acquaintance among industrial leaders throughout the Ohio Valley.

- **Henry M. Hogan** and **Frederic G. Donner** have been elected vice-presidents of General Motors Corp. and members of the administration committee. Mr. Hogan has been assistant general counsel with headquarters in Detroit, and Mr. Donner has been general assistant treasurer with headquarters in New York.

- **M. J. Tennes, Jr.**, president of the Shafer Bearing Corp., Chicago, has entered active service as Captain in the United States Army Air Corps. During his absence the management of the company will be under the direction of **John F. Ditzell**, vice-president and general manager.

- **George Terborgh**, heretofore senior economist of the Board of Governors of the Federal Reserve Bank at Washington, has been made secretary of the Machinery and Allied Products Institute, Chicago, succeeding Alexander

Konkle, who has resigned to re-enter private business as treasurer of Arthur J. O'Leary & Son Co., Chicago. For the past 11 years with the Federal Reserve Bank and the Brookings Institution, Mr. Terborgh has specialized in the field of capital markets, capital formation and durable goods. He received his Ph.D. in economics from the University of Chicago in 1928.

- **Arch Warner**, formerly of the Detroit office of Mechanics Universal Joint Division, Borg-Warner Corp., Rockford, Ill., has been transferred to Illinois and named assistant works manager.

- **Edwin Fisher**, associated for the past 13 years with the Cadillac Motor Car Co., for the past four as manager of the company's Jefferson Avenue branch in Detroit, has resigned to join the Progressive Welder Co. in an executive sales capacity. He will assist in the development of sales of the company's equipment in the Middle West.

- **George W. Davies** has been named sales manager of the original equipment piston ring division of the Sealed Power Corp., Muskegon, Mich. For seven years Mr. Davies has been manager of the Detroit office for Sealed



Conway Studios, Inc.

C. G. MATTHEWS, whose appointment as assistant sales manager of the wire department of Wickwire Spencer Steel Co. was announced in these columns on July 3.

Power. **George L. Hawn**, who has been with the company since 1925, will take over management of the Detroit office and will be assisted by **Donald W. Smith**, recently added to the Detroit office as sales engineer.

- **Walter F. Bugenhagen** has been named vice-president in charge of sales for the Aluminum Goods Mfg. Co., Manitowoc, Wis. He joined the company in 1919 at the age of 18 and worked his way up from a job in the rolling mills.

- **O. C. Mueller** has been transferred as sales representative of the mechanical division of the B. F. Goodrich Co., Akron, Ohio, from Cincinnati to Pittsburgh. He is succeeded at Cincinnati by **A. C. Lutz**. **J. M. Cooney** has gone from Cincinnati to Dayton, **B. E. Silver**, formerly of the Washington office, has joined the hose sales department in Akron, and **J. V. Powers**, sales correspondent in the New York district office, has been made field representative of the district, with headquarters in Albany.

- **Dr. Arthur S. Adams** has been appointed assistant dean of the College of Engineering of Cornell University.

- **David E. Beatty**, former vice-president and general manager of Safway Steel Scaffolds Co., Milwaukee, will erect a factory of his own at San Francisco to handle the Safway West Coast, Hawaiian and Alaskan business. High freight rates on fabricated products and greater opportunity for more extended personal sales efforts prompted the move. Mr. Beatty is succeeded at Safway by **B. D. Christian**, former vice-president in charge of sales of Crocker Wheeler Co., Newark, N. J.

- **Frank C. Neal, Jr.**, has been appointed arc welding specialist in the Dallas district office of the General Electric Co. He succeeds **N. M. Voorhies**, who has been transferred to the Chicago office. Mr. Neal has been identified with G-E since 1936, after his graduation from Kansas University, and has been with the welding section since 1939.

- **L. J. Lyons** has been made district sales manager of the newly-opened Eastern sales office, at 15 Park Row, New York, of Brainard Steel Corp., Warren, Ohio. **G. D. Frost**, who has represented the

company in the metropolitan area for a number of years, will continue to be associated with the office.

- **W. A. Fletcher**, formerly district sales manager in Cleveland for E. F. Houghton & Co., Philadelphia, has become district sales manager of the Western division, with headquarters in San Francisco.

- **Carleton Reynell** has been appointed general manager of purchases and traffic of Worthington Pump & Machinery Corp., Harrison, N. J. **Frederic W. Thomas** has become assistant general manager of purchases and **Dean K. Chadbourne**, assistant general manager of traffic.

- **Fred W. Muller**, since 1937 connected with Armstrong Cork Co., Lancaster, Pa., has been made manager of the company's high temperature insulation department. He succeeds **Alfred M. Ritts**, who has been made assistant manager of the newly-organized munitions division of the company.

- **L. Bruce Grannis** has been appointed vice-president in charge of sales of the Anker-Holth Mfg. Co., Chicago. **Leo T. Neidow**, originator of the Airgrip chucking devices being manufactured by the company, has been made vice-president in charge of engineering and production. Both men received their engineering education at Armour Institute of Technology.

- **Elmer E. Forslund** has joined the New England office of Foxboro Co., Foxboro, Mass. **William W. Nelson**, who has been a service engineer with the company, has been transferred to the New England sales force. **Paul T. Graff** has also joined the Foxboro staff as sales engineer.

- **Dr. Harvey C. Rentschler**, director of research for the lamp division of Westinghouse Electric & Mfg. Co., Bloomfield, N. J., has been conferred the honorary degree of doctor of science in engineering by Princeton University.

- **F. V. MacArthur** has resigned as secretary and assistant treasurer of the Link-Belt Co., Chicago, after nearly 50 years of service and will retire from business. **Harry E. Kellogg**, treasurer and assistant secretary, has been elected secretary, thus becoming secretary-treasurer.

Obituary

- **Fred J. Fisher**, oldest of the famous Fisher Brothers, founder and first president of the Fisher Body Co., died in Henry Ford Hospital, Detroit, on July 14, at the age of 63. Mr. Fisher's financial and industrial empire was built on the foundation of a blacksmith's shop and the carriage industry. Fred Fisher and his brothers made some of the first bodies for Detroit-made automobiles.

Fred Fisher was born in 1878 in Sandusky, Ohio, where his father had gone to learn the carriage trade. Together with Charles T., Fred traveled from city to city working in the best carriage shops to get experience. They picked Detroit as their own starting place. They worked in Detroit at the C. R. & J. C. Wilson Carriage Co. Fred as superintendent and Charles as assistant until they formed their own company in 1908. It was taken over by General Motors Corp. in 1926.

- **William Oberhelman**, vice-president of the Hill & Griffith Co., Cincinnati, and in charge of the foundry supply company's Birmingham branch, died June 28 at Birmingham, aged 66 years. Born in Cincinnati, Mr. Oberhelman, at the age of 13, started working with the company there as an office boy.

- **James G. West, Jr.**, former assistant general manager, Jones & Laughlin Steel Corp., Pittsburgh, in charge of the blast furnace phase of the industry, died recently at his home in Pittsburgh. Mr. West went to Pittsburgh from the Aliquippa plant of Jones & Laughlin in 1916 to become assistant superintendent at the Eliza works. In 1929 he was made assistant general manager in charge of blast furnace operations, which position he held until 1936 when he retired. Previous to his connections with Jones & Laughlin, Mr. West had been with National Tube Co., Carnegie Steel Co. and Illinois Steel Co.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	July 15, 1941	July 8, 1941	June 17, 1941	July 16, 1940		July 15, 1941	July 8, 1941	June 17, 1941	July 16, 1940
Flat Rolled Steel:					Pig Iron:				
(Cents Per Lb.)					(Per Gross Ton)				
Hot rolled sheets	2.10	2.10	2.10	2.10	No. 2 fdy., Philadelphia	\$25.84	\$25.84	\$25.84	\$24.84
Cold rolled sheets	3.05	3.05	3.05	3.05	No. 2, Valley furnace	24.00	24.00	24.00	23.00
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50	No. 2, Southern Cin'ti	24.06	24.06	24.06	23.06
Hot rolled strip	2.10	2.10	2.10	2.10	No. 2, Birmingham	20.38	20.38	20.38	19.38
Cold rolled strip	2.80	2.80	2.80	2.80	No. 2, foundry, Chicago†	24.00	24.00	24.00	23.00
Plates	2.10	2.10	2.10	2.10	Basic, del'd eastern Pa.	25.34	25.34	25.34	24.34
Tin and Terne Plate:					Basic, Valley furnace	23.50	23.50	23.50	22.50
(Dollars Per Base Box)					Malleable, Chicago†	24.00	24.00	24.00	23.00
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00	Malleable, Valley	24.00	24.00	24.00	23.00
Manufacturing ternes	4.30	4.30	4.30	4.30	L. S. charcoal, Chicago..	31.34	31.34	31.34	30.34
Bars and Shapes:					Ferromanganese‡	120.00	120.00	120.00	120.00
(Cents Per Lb.)					†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.				
Merchant bars	2.15	2.15	2.15	2.15	Scrap:				
Cold finished bars	2.65	2.65	2.65	2.65	(Per Gross Ton)				
Alloy bars	2.70	2.70	2.70	2.70	Heavy melt'g steel, P'gh	\$20.00	\$20.00	\$20.00	\$19.00
Structural shapes	2.10	2.10	2.10	2.10	Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Wire and Wire Products:					Heavy melt'g steel, Ch'go	18.75	18.75	18.75	17.375
(Cents Per Lb.)					Carwheels, Chicago				19.00
Plain wire	2.60	2.60	2.60	2.60	Carwheels, Philadelphia				20.75
Wire nails	2.55	2.55	2.55	2.55	No. 1 cast, Pittsburgh	22.00	22.00	22.00	19.75
Rails:					No. 1 cast, Philadelphia	24.00	24.00	24.00	21.25
(Dollars Per Gross Ton)					No. 1 cast, Ch'go*	21.00	21.00	21.00	16.75
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00	*Changed to gross ton basis.				
Light rails	40.00	40.00	40.00	40.00	Coke, Connellsville:				
Semi-Finished Steel:					(Per Net Ton at Oven)				
(Dollars Per Gross Ton)					Furnace coke, prompt	\$6.125	\$6.125	\$6.125	\$4.25
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00	Foundry coke, prompt	6.875	6.875	6.875	5.25
Sheet bars	34.00	34.00	34.00	34.00	Non-Ferrous Metals:				
Slabs	34.00	34.00	34.00	34.00	(Cents per Lb. to Large Buyers)				
Forging billets	40.00	40.00	40.00	40.00	Copper, electro., Conn.*	12.00	12.00	12.00	11.50
Wire Rods and Skelp:					Copper, Lake, New York	12.00	12.00	12.00	11.50
(Cents Per Lb.)					Tin (Straits), New York	53.50	53.125	52.375	51.25
Wire rods	2.00	2.00	2.00	2.00	Zinc, East St. Louis	7.25	7.25	7.25	6.25
Skelp (grv'd)	1.90	1.90	1.90	1.90	Lead, St. Louis	5.70	5.70	5.70	4.85
					Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50
					*Mine producers only.				

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 138-144 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

FINISHED STEEL				PIG IRON				SCRAP STEEL			
July 15, 1941	2.261c. a Lb.			\$23.61 a Gross Ton				\$19.17 a Gross Ton			
One week ago	2.261c. a Lb.			\$23.61 a Gross Ton				\$19.17 a Gross Ton			
One month ago	2.261c. a Lb.			\$23.61 a Gross Ton				\$19.17 a Gross Ton			
One year ago	2.261c. a Lb.			\$22.61 a Gross Ton				\$18.38 a Gross Ton			
	High	Low		High	Low			High	Low		
1941				\$23.61, Mar. 20	\$23.45, Jan. 2			\$22.00, Jan. 7	\$19.17, Apr. 10		
1940	2.261c., Jan. 2	2.211c., Apr. 16		23.45, Dec. 23	22.61, Jan. 2			21.83, Dec. 30	16.04, Apr. 9		
1939	2.286c., Jan. 3	2.236c., May 16		22.61, Sept. 19	20.61, Sept. 12			22.50, Oct. 3	14.08, May 16		
1938	2.512c., May 17	2.211c., Oct. 18		23.25, June 21	19.61, July 6			15.00, Nov. 22	11.00, June 7		
1937	2.512c., Mar. 9	2.249c., Jan. 4		23.25, Mar. 9	20.25, Feb. 16			21.92, Mar. 30	12.92, Nov. 10		
1936	2.249c., Dec. 28	2.016c., Mar. 10		19.74, Nov. 24	18.73, Aug. 11			17.75, Dec. 21	12.67, June 9		
1935	2.062c., Oct. 1	2.056c., Jan. 8		18.84, Nov. 5	17.83, May 14			13.42, Dec. 10	10.33, Apr. 29		
1934	2.118c., Apr. 24	1.945c., Jan. 2		17.90, May 1	16.90, Jan. 27			13.00, Mar. 13	9.50, Sept. 25		
1933	1.953c., Oct. 3	1.792c., May 2		16.90, Dec. 5	13.56, Jan. 3			12.25, Aug. 8	6.75, Jan. 3		
1932	1.915c., Sept. 6	1.870c., Mar. 15		14.81, Jan. 5	13.56, Dec. 6			8.50, Jan. 12	6.43, July 5		
1931	1.981c., Jan. 13	1.883c., Dec. 29		15.90, Jan. 6	14.79, Dec. 15			11.33, Jan. 6	8.50, Dec. 29		
1930	2.192c., Jan. 7	1.962c., Dec. 9		18.21, Jan. 7	15.90, Dec. 16			15.00, Feb. 18	11.25, Dec. 9		
1929	2.236c., May 28	2.192c., Oct. 29		18.71, May 14	18.21, Dec. 17			17.58, Jan. 29	14.08, Dec. 3		
Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.											
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.											
Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.											

Summary of the Week

- Wildcat strike closes Detroit steel plant temporarily . . . Republic Steel agrees to sign labor contract with SWOC . . . Ingot production declines 1½ points to 97 per cent . . . New ship program to require 1,500,000 tons of plates.

THE prospect that strikes, which have hampered the national defense program at some large steel-consuming plants in the last year, may interfere directly with steel production, threw another element of uncertainty into the steel industry's position at midweek. Need for uninterrupted production of steel is so great that the stoppage caused by a wildcat strike at Great Lakes Steel Corp.'s Ecorse, Mich., plant seemed unlikely to continue long. A strike of white-collar workers at Tennessee Coal, Iron & Railroad Co., Birmingham, over demands for a 10c. an hour wage increase apparently has been averted through certification of the dispute to the National Defense Mediation Board.

An outstanding piece of labor news this week was an announcement by Tom M. Girdler, chairman of Republic Steel Corp., that the corporation agrees to recognize the SWOC as an exclusive bargaining agency in any of its plants where the Labor Board certifies a majority of employees are members of the union in good standing. Labor practice cases involving Republic have been settled.

AS a consequence to the Great Lakes shutdown, which apparently was staged to block signing later this week of a contract between the company and the Steel Workers Organizing Committee, the national rate of steel production dropped to 97 per cent, a decline of 1½ points from last week. Most other steel-producing districts are continuing to operate at last week's rate, with the important Pittsburgh and Chicago districts at 100 per cent of capacity. The current 97 per cent level compared with the average of 98.2 per cent in June and with 98.7 per cent in May. Production of steel in the first six months of 1941 broke all output records, totaling 40,911,886 net tons, or almost 40 per cent above the total of 29,405,402 tons produced in the first half of 1940.

Signs that the problem of delivering enough steel plates for ships and railroad cars in the short time called for by new expansions in the defense program is slowly being solved are increasing. Plate production in May, the latest reported month, was at the rate of 101 per cent of capacity, compared with 88 per cent in April. Changes in strip mills to adapt them for rolling car and ship plates can increase the steel industry's plate capacity by as much as 2,000,000 tons, a revamping of capacity which seems necessary in the light of recent developments. Last week, for example, President Roosevelt asked for 566 Maritime Commission ships which will require an estimated 1,548,480 tons of steel, mostly plates. This requirement is a good example of how plate mill schedules can be disrupted.

MEANWHILE steel companies this week are submitting to the Iron and Steel Industry Defense Committee a new analysis on backlog and current orders divided into four classifications: Defense, British, other export, and other domestic business. Under the defense classification the companies are including steel requirements whether direct or indirect. The iron and steel committee is expected to use this information as a basis for allocating defense orders. Of outstanding importance to commercial steel users, who have been warned that they may soon get very little steel or no steel at all, is OPACS step giving priority status, ahead of other civilian demands, to materials and equipment necessary to maintain operation of automobiles, refrigerators and other consumers' durable goods.

Failure of the present control machinery to provide an adequate supply of scrap steel and the Government's refusal to act upon recommendations by some scrap groups, intended to increase the flow of scrap, apparently will result in the placing of responsibility of the anticipated steel ingot output curtailment on Washington. Such a curtailment appears particularly likely in Eastern and Ohio plants. The amount of hoarding is considered of little consequence in comparison with the present scrap deficit. At its mid-year convention this week at Detroit, the Institute of Scrap Iron and Steel again called on OPM and OPACS to take steps to accelerate the movement of scrap from remote areas.

Fabricated structural steel awards for the week dropped to 11,150 tons from 32,000 tons last week, with the only lettings of size being 2000 tons for an Army warehouse at Seattle, Wash., and 1000 tons for a quay wall at Bremerton, Wash., for the Puget Sound Navy Yard. New structural projects, however, advanced to 21,255 tons from 15,700 tons.

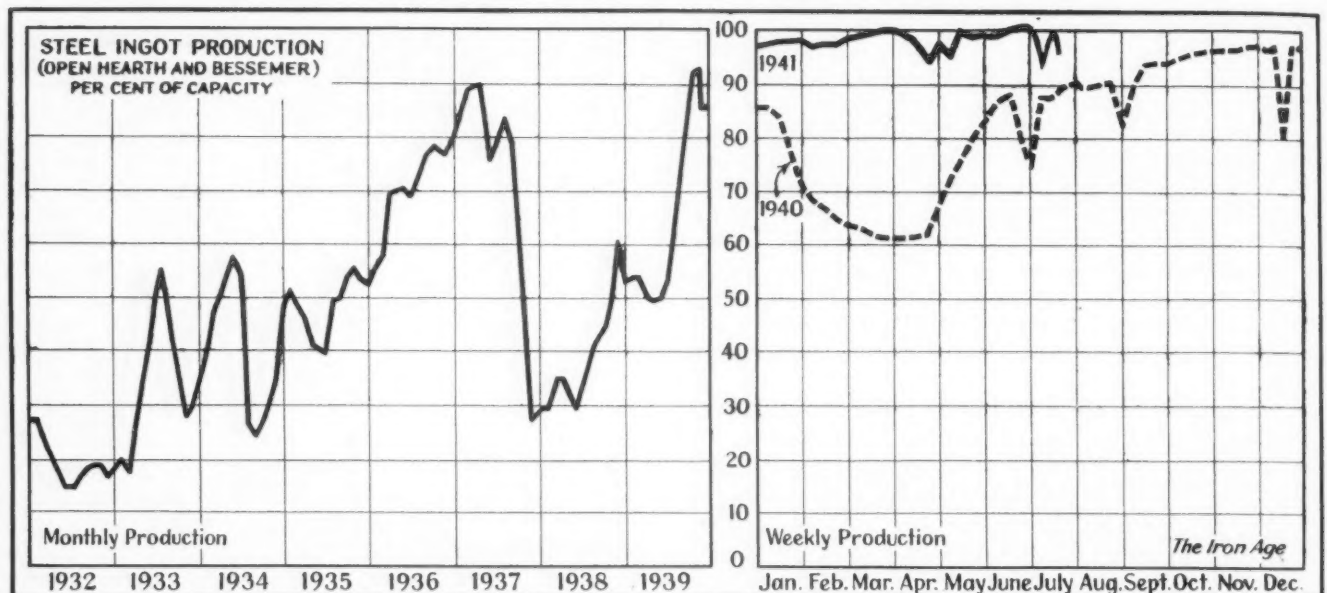
The Industrial Pace . . .

Resuming the rising trend interrupted by the July 4th holiday, THE IRON AGE capital goods index last week gained 2.9 points to 121.4 per cent. Heavy construction is by far the strongest factor in the index, with building awards last week amounting to \$298,718,000, breaking by 25 per cent an all-time record established during the week ending October 17, 1940, and sending this factor of the index spiraling from 120.5 to 134.7 per cent of the base years. Ordnance facilities, defense projects, and other public works accounted for nearly 93 per cent of the past week's volume.

Automobile production, showing a sharper than seasonal drop, is off 4.1 points this week. This decline is partly attributed to plants beginning to close for model change-overs and partly to the shut-down of three plants of a large producer due to a shortage of materials caused by a strike.

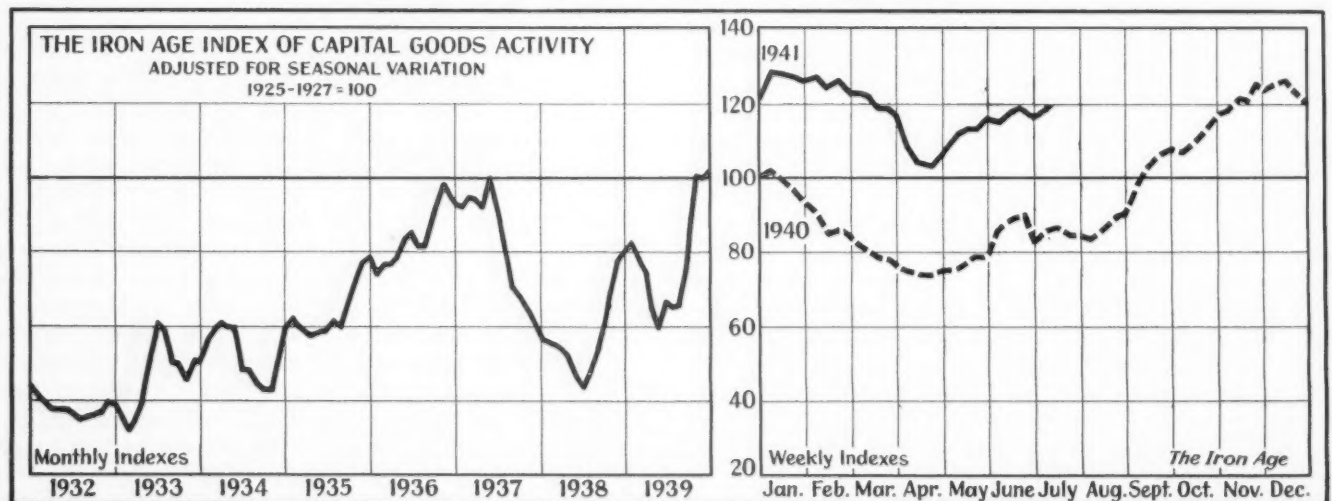
Pittsburgh output and shipments, lagging a week behind the other components of the index, had a wide variation in working schedules over the holiday period. While steel operations were off only slightly, coal mines in the district were closed for four days, causing production to fall

Great Lakes Strike Cuts Rate to 97%



District Ingot Production, Per Cent of Capacity	Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio	Western	St. Louis	Eastern	Aggregate
Current Week ..	100.0	100.0	99.0	97.5	99.0	106.0	90.0	35.0	95.0	105.0	102.5	111.0	95.5	97.0
Previous Week ..	99.0	100.5	99.0	97.5	99.0	106.0	90.0	112.5	95.0	109.0	102.5	111.0	95.5	98.5

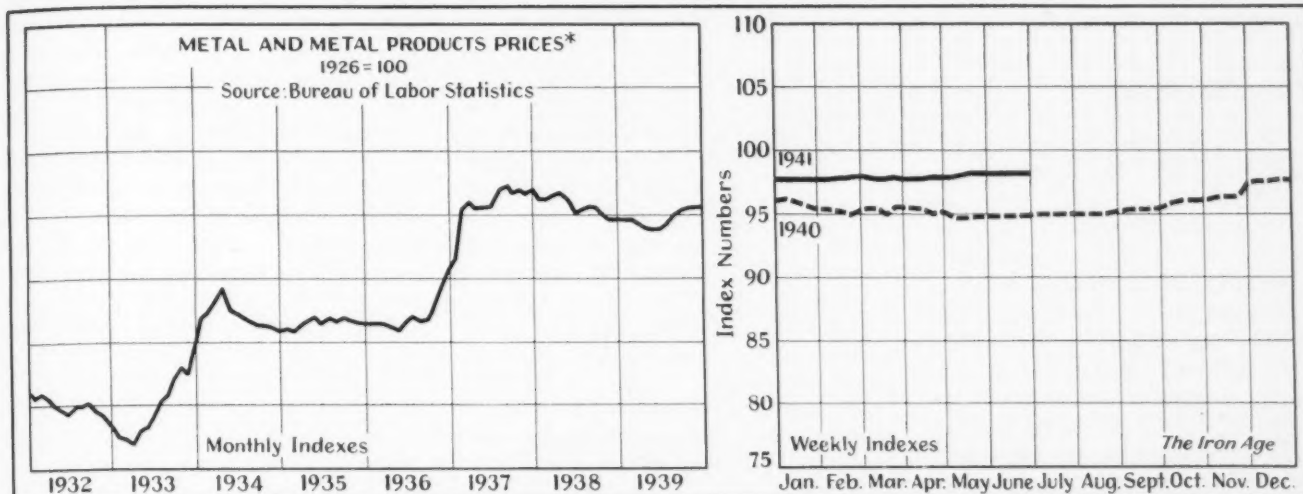
Index Recovers from Holiday Dip



Component	Week Ended	July 12	July 5	June 14	July 13, 1940	July 13, 1929
Steel ingot production ¹		144.6	137.1	143.7	128.1	141.4
Automobile production ²		110.4	114.5	120.6	62.9	127.3
Construction contracts ³		134.7	120.5	111.7	71.6	119.2
Forest products carloadings ⁴		83.2	85.1	75.2	55.9	124.8
Pittsburgh output and shipments ⁵		134.1	135.4	125.5	106.3	130.9
COMBINED INDEX		121.4	118.5	115.3	85.0	128.8

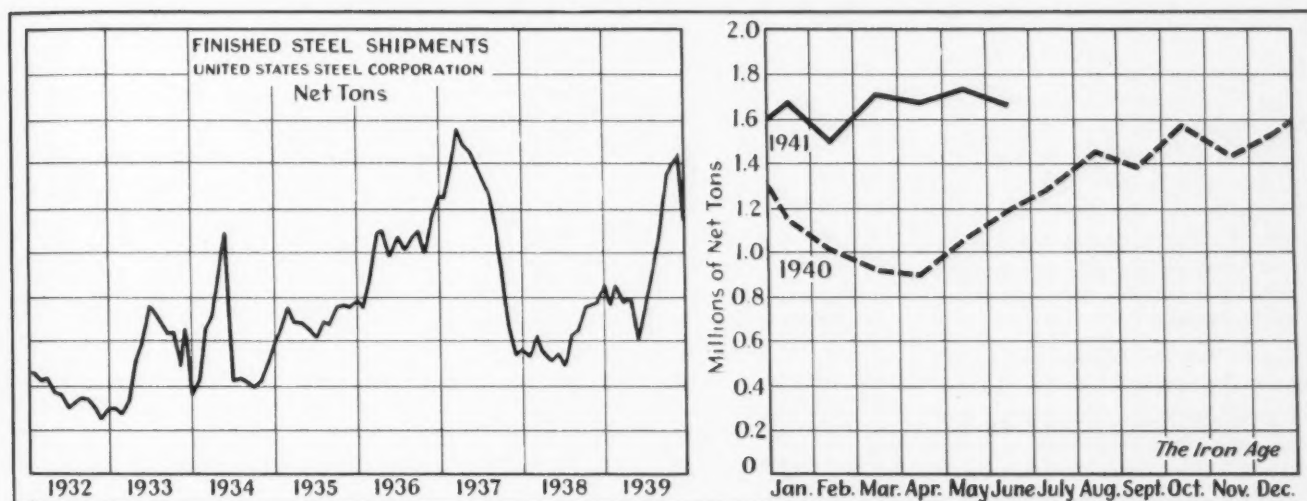
Sources: ¹ THE IRON AGE; ² Ward's Automotive Reports; ³ Engineering News-Record; ⁴ Association of American Railroads; ⁵ University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended July 5. Other indexes cover week of July 12.

Metal Prices Follow Steady Course

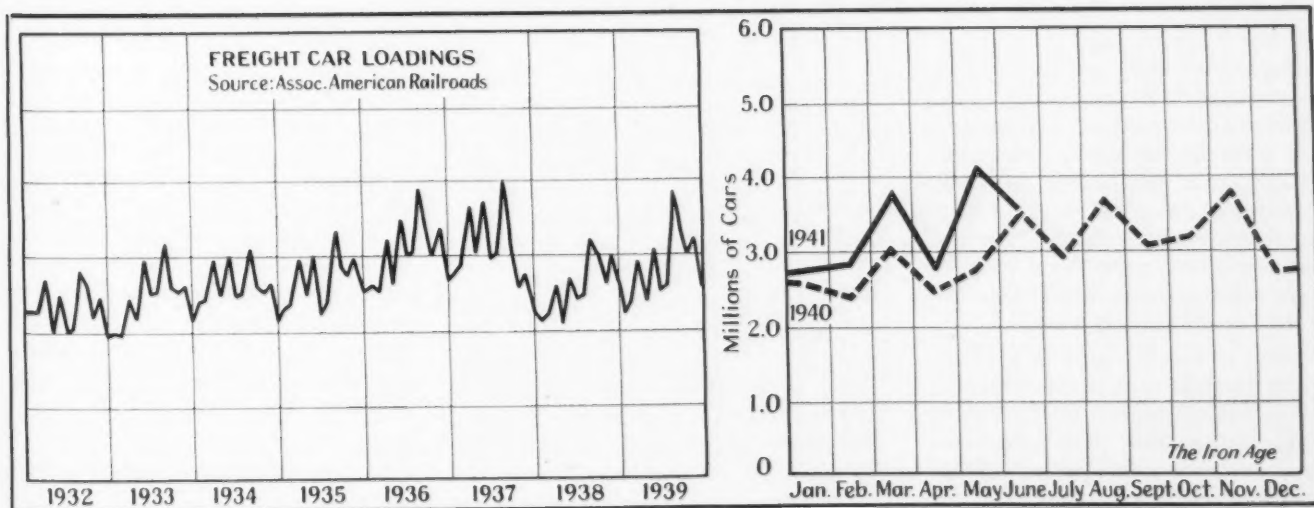


* Based on 147 items, including iron, steel, non-ferrous metals, and finished products and agricultural equipment, automobiles, tools, bolts, etc.

Finished Steel Shipments Decline 4.4%



June Car Loadings Off Sharply



Market News

...THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

... Iron and Steel Committee completes new backlog analysis

The slight dip in the influx of new business at PITTSBURGH apparent a week ago has been wiped out in the past week by an increase in the volume of fresh orders. Steel companies this week were submitting to the Iron & Steel Industry Committee a new analysis on backlog and current orders divided into four classifications: British; other export; defense; and others. Under the defense classification the companies are including steel requirements, whether they are direct or indirect. It is believed that the Iron & Steel Industry Committee will use this information as a basis for allocating various national defense orders in an equitable manner among various steel companies. The study is expected to disclose to what extent the various steel companies are participating in the national defense program. Informal figures indicate that many companies are using 60 to 65 per cent of current operations for defense purposes, while others are even maintaining a higher rate for that type of business.

Heavy orders for semi-finished steel for Great Britain proved the feature of the past week at CLEVELAND and YOUNGSTOWN. Shipments have started already. The critical situation affecting semi-finished steel supplies is intensified also by the greater need for plates from continuous mills. The necessary additional open hearth furnaces cannot be built in a hurry since the materials are not readily available.

Of all the steel industry's problems, however, the scrap situation has become the most serious at some Ohio plants recently. An appeal was made to Washington Monday by operators of a Central Ohio mill where only a meager stock pile existed. Without immediate relief in the form of more scrap, operations were expected to begin declining later this week.

Buying decreased about 15 per cent to date in July compared with the same period in June. Defense orders continue to increase. One large producer has been taking no new business except defense orders and an-

other mill is now close to that point. Structural steel and plate fabricators are submitting orders and inquiries in extremely large quantities. Most of these are of a defense nature and require prompt delivery. Less pressure is being exerted on mills for delivery by non-defense interests. Concrete bar business is now mostly of a defense nature. Wood is being substituted for steel in piling projects on a larger scale. Pipe, bolt, nut and rivet and pig iron buying is heavier with a shortage of spelter hampering galvanizing operations.

All shipments will be on an f.o.b. Chicago basis when books are opened for the first quarter, it is stated. Delivery on defense steel orders are very close to schedule in the Middle West.

While amount of tonnages being booked at BIRMINGHAM maintains a steady volume, orders from single car-load buyers and small consumers are reported dropping off because of deferred deliveries. Non-defense orders or orders with low priority ratings are not going out as promised, due to demand for material with high priorities.

While the situation in the pig iron market in the EASTERN PENNSYLVANIA area is unchanged, there is considerable speculation as to why more merchant producers have not applied for a price relief. With Struthers Iron & Steel Co., and Pittsburgh Coke & Iron Co., receiving permission to sell iron over the ceiling prices when prices were established by OPACs, it is thought that certain other independent producers would encounter very little difficulty in obtaining permission to sell above the market.

It is expected that within a short time the government will allocate pig iron, taking this responsibility off the hands of the producers. Now, producers are shipping in very small lots to as many consumers as possible in order to keep as many as possible operating.

Unconfirmed rumors in the SAN FRANCISCO Bay area predicted the location of two additional shipyards under most recent additions to the Federal Naval appropriation, one yard to be confined to Navy fighting vessels and the other to be government financed and operated

by a newly organized company for the building of cargo carriers. Arriving on a tour of inspection of defense projects OPM Chief William S. Knudsen denied that additional yards would be created and stated that new appropriations would add additional units to yards already existing. Under either circumstance the difficulty of shipping major fabrications and ship plates to the Pacific Seaboard for additional contracts will be the limiting factor, according to present conditions and experience.

Manufacturers who supply products used in essential industries in the St. Louis district are clamoring for steel.

Shipbuilding

... Preference ratings issued for 20 new shipyards

Blanket preference ratings for material and specified equipment for 20 ship yards being built under contract with the Maritime Commission were issued early this week by OPM's priorities division. The ratings were similar to those previously issued to shipbuilders except that the new order is applicable to material going into ship ways construction as distinguished from actual ship construction.

For ship ways expected to produce completed ships this year, the OPM assigned an A-1-a preference rating; and for ways expected to produce completed ships in 1942 and 1943, it assigned an A-1-b rating. It was explained that the preference ratings are applicable only to material included in the priorities critical list or on a special list of materials attached to the order.

The rating may be applied to material necessary to outfit the ship ways for production, including deliveries of portable or stock tools, but it cannot be used to obtain machine tools. OPM explained that machine tools must be acquired, in the usual manner—by using individual preference rating certificates.

Pig Iron

... Inventory control measure expected soon from Washington

Close monthly control over melters' inventories and receipts of pig iron will be provided in the new control measure which Washington is expected to announce momentarily, according to reports at CLEVELAND. It is expected foundries first will rate themselves by listing types of defense work which they are engaged in. Producers then will fill the top ranking requirements first and work on down the list. Probably the measure will be designed to avoid disruptions of consumer-producer relationships wherever possible.

Merchant pig iron sellers are taking care of regular customers in this territory. They report that in instances where consumers have been using other materials they are unable to supply them. Business is being booked for delivery during the third quarter and quite a little spot tonnage is being taken. Foundry coke and charcoal iron shipments are heavy. Charcoal iron production is well sold for the next three months.

Pig iron sources at PITTSBURGH look for a showdown soon on the pig iron situation as many large plants are almost at the point of depleting what little inventories they had left. At least two plants have definitely curtailed operations recently because of inability to obtain supplies and all eyes are turned toward Washington, awaiting government action.

With plenty of business to be had, furnace representatives in the SOUTHERN OHIO district are very wary of making commitments. As a matter of fact, books have not been opened generally for third quarter requirements yet, primarily because the industry generally feels that all items of the recent price ceiling decree have not been sufficiently clarified for efficient operations. Inventories of foundries are running close to the line, but so far no curtailment in castings output has developed. Foundrymen, accustomed to carrying comfortable inventories of iron, are now, in many instances, operating only on from seven to ten-day margins.

There has been a definite lull in new bookings in EASTERN PENN-

Steel Shortage "On Paper," Tower Says

... The alleged shortage of steel is "only on paper," Walter S. Tower declared last week in an address at Chicago before the annual meeting of the Purchases and Stores Division of the Association of American Railroads.

"No one can know in advance what the precise demand for steel will total in this calendar year," the American Iron and Steel Institute president said. "Much less clear is the prospect for 1942, although for both years the broad estimates of our military and British needs are fairly specific and the totals are less than one-fourth of the steel industry's ability to produce."

"Any real shortage of steel for non-military uses seems both unlikely and unnecessary," Mr. Tower said. "Should the unlikely happen, it will come early, it will be brief, and it can be dealt with in one way; that way is temporarily to ration or to curtail the more indispensable uses. The machinery for such action already exists. It could be applied promptly. It should not be necessary to use it generally, or for very long in any case."

SYLVANIA in the past week. Some quarters suggested that it may be due to consumers being unable to place their orders for such a long time that they have given up further attempts. While shipments to customers in this area are moving in, they are not in the quantities that are desired. Orders being booked now, in most cases, are for 1942 delivery and are nearly 100 per cent national defense orders. Civilian consumers have almost reached the point of being unable to place orders with the mills for any type of material.

The combination of hot, sticky weather and dwindling scrap piles caused a falling off in the melt of pig iron in NEW ENGLAND the past week, quite a few foundries that have been operating six days a week going on a five-day basis. Another unfavorable factor is the growing tightness of the pig iron supply situation. Small foundries with limited capital are the hardest hit for iron supplies, the larger ones being fairly well stocked. However, unless the unforeseen transpires a real pinch in supplies is

virtually certain to develop the last quarter of 1941.

Iron production in the BIRMINGHAM area will be unchanged for the week of July 13. The following furnaces will be in blast, all on iron: Tennessee Coal, Iron & Railroad Co., five at Ensley and two at Fairfield; Woodward Iron Co., three; Sloss-Sheffield Steel & Iron Co., four, and Republic Steel Corp., two at Thomas Works and one at Gadsden.

Some makers are selling iron to melters in the ST. LOUIS district for third quarter at prices prevailing at time of shipment as a means of "protection," while others are declining to book any future orders, shipping to regular customers on proof that the material is actually required.

Although some foundries in the BUFFALO area have been affected by lack of scrap supplies, none so far have had to curtail production because of inability to obtain sufficient pig iron, a checkup here revealed. However, the increase of tonnages with priority earmarks shows no signs of abating and may result, before long, in trouble for non-defense iron consumers.

Sheets and Strip

... Shortage affects manufacturers of grave vaults

Cleveland reports that output of some consumer goods such as stoves and washing machines is being curbed by difficulty in obtaining auxiliary parts such as brass valves and agitators. In some cases this situation is serving to ease pressure on sheet steel suppliers. Meanwhile, demand for strip for marine blowers, materials handling and shell loading equipment and other defense items is rising slowly. Grave vault manufacturers report being seriously disturbed by their inability to obtain the wide sheets they require. One of the curious sidelights of the past week was the report from a consumer that he obtained a quicker promise on galvanized strip from one mill than could be made on ordinary hot strip from the same company.

While sheet and strip makers at PITTSBURGH are still able to supply fair amounts of material to consumers with non-defense business, the amount of this tonnage is grow-

ing steadily smaller. Prime reason is the increase in plate tonnage produced and to be produced on wide strip mills, as well as an increase in the amount of flat rolled material carrying preferential ratings. When flat rolled supplies going to the automobile industry are curtailed, the resulting room on rolling mill schedules will apparently be filled by either plate tonnage, defense needs, or some of the steel

will be utilized in other product departments.

Chicago steel mills have reduced shipments to automobile makers several times in recent weeks, another drastic reduction being made in the last week.

The steady increase in defense demands in the SOUTHERN OHIO is bringing still more serious curtailment of civilian production. Mill

operators comment that the government economists estimate that only 25 per cent of the steel capacity will be needed for war materials is too conservative, the trend at the present time indicating that it will go much beyond that, with 50 per cent or more a likely figure.

Operations

... Great Lakes Steel strike reduces steel operations to 97 per cent

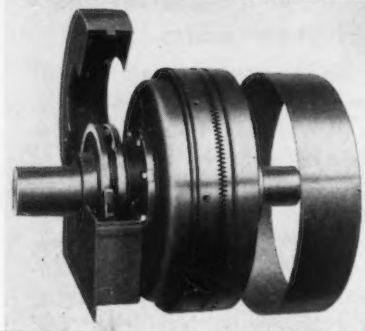
The Iron Age ingot rate for this week was reduced by 1½ points to 97.0 per cent. This drop in scheduled production was due largely to a wildcat strike at the Great Lakes Steel Division of National Steel Corp. which will cut 77.5 points off the Detroit area's steel operations unless it is settled within a matter of days. The Detroit rate for this week is estimated at 35 per cent of capacity. Most other districts will continue to produce at last week's pace. Pittsburgh shows an increase of one point to 100 per cent, Chicago a decline of a half point to that same level and production in the Southern Ohio region will decline to 105 from 109 per cent.

Fabricated Steel

... Awards decline to 11,150 tons from 32,000 tons a week ago

Fabricated structural steel awards dropped to 11,150 tons from 32,000 tons last week. The only lettings of size are 2000 tons for an army warehouse at Seattle, Wash., and 1000 tons for a quay wall at Bremerton, Wash., for the Puget Sound Navy Yard.

New structural steel projects advanced to 21,255 tons from 15,700 tons. The largest inquiries include 8500 tons at Philadelphia for the Southwark station of the Philadelphia Electric Co.; 2650 tons at Ogden, Utah, for an Air Corps airplane repair shop at Hill Field; 2500 tons for an addition to the Bell Aircraft plant at Niagara Falls, N. Y.; 2000 tons at Dunkirk, N. Y., for mill buildings for the Allegheny-Ludlum Steel Corp.; and 1500 tons at Brooklyn for city terminal market buildings.



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Semi-Finished Steel

... Shipments to Britain start from Youngstown area

Shipments have started already for the British from the YOUNGSTOWN district, even before receipt of formal orders. This material is part of the first lot of semi-finished bought by the U. S. Treasury Department. Additional heavy tonnages which will be filled from YOUNGSTOWN mills were received during the past week.

The semi-finished steel situation is becoming tighter each week in the PITTSBURGH district as governmental projects materialize and as actual production gets under way on 1,000,000 tons of steel for the British which is to be shipped in July, August, and September. The abundance of orders carrying preference or priority ratings has reached such a point that the amount of semi-finished steel left over to be allocated for non-defense steel products is becoming steadily smaller.

Plates

... New ship program to require 1.4 million tons of steel

Plate production by high speed mills at CLEVELAND gained again last week, providing a new strain on supplies of semi-finished steel. The week's new business included car building tonnages for eastern railroads and additional orders from marine yards.

It is estimated that the 563 Maritime Commission boats requested by the President last week will require approximately 1,400,000 tons of steel, a large portion of which will be plates. This requirement is a prime example of how plate rolling mill schedules can be disrupted by the sudden appearance of large scale governmental projects on which no information was available previously.

Railroad requirements at CHICAGO will be much larger in the next few months. Orders are being booked by CHICAGO mills from nearly all of the railroad car shops in this territory. Actual specifications are also being received on a large scale from shipbuilders.

Makers of tanks and containers for the oil industry in the ST. LOUIS territory are clamoring for material for work in hand and in prospect.

Merchant Bars

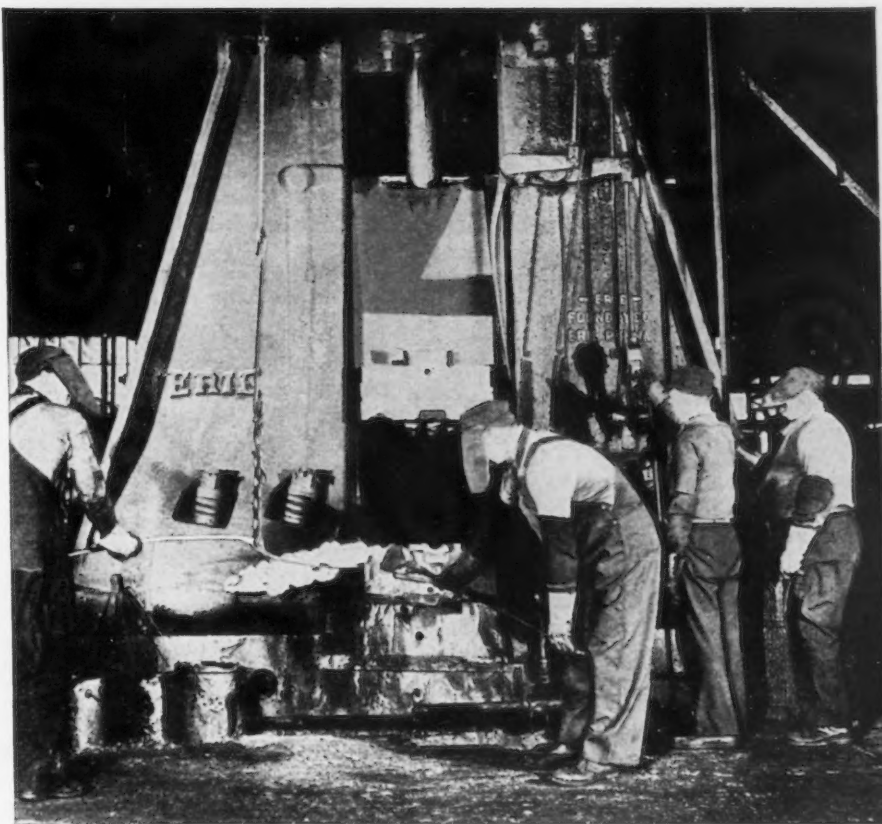
... Some bolt and nut makers face bar material shortage

Specifications for shell making received so far this month at CLEVELAND have been sufficient to sustain new tonnage at practically the same level as in the corresponding part of June. Still overhanging bar markets are very large cold fin-

ished bar tonnages required for ammunition, the amount needed being far in excess of production capacity.

Some bolt and nut makers in the greater PITTSBURGH area are facing a shortage of bar material and their visible inventories are, in some cases, completely exhausted. Bar stock defense requirements continue to rise rapidly, with the real push still to come when the

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government begins to allocate large tonnages of munition steel.

Tin Plate

... Mills continue to operate above rated capacity

Tin Plate cold reduction mills continue to operate at above rated capacity but specifications are reaching mills at a much greater volume than actual production. Miscellaneous can makers are still seeking new or additional sources of supplies as they fear a "pinch" later in the year. It is fairly definite, according to PITTSBURGH sources, that tinplate departments throughout the rest of the year will be unable to obtain any more steel than is now being allocated to them from available supplies.

Railroad Buying

... 1300 cars, 50 locomotives and 65,000 tons of rails ordered

Orders reported this week total 50 locomotives, 1300 freight cars and 65,000 tons of rails, compared with 6115 freight cars and 15 locomotives last week.

St. Louis-San Francisco bought 15 type 4-8-4 steam and five 1000-hp. diesel-electric locomotives from Baldwin Locomotive Works, and Delaware & Hudson ordered 15 articulated heavy freight engines of the 4-6-6-4 type from American Locomotive Co.

Other locomotive orders were: Louisville & Nashville eight and Illinois Central two 4000-hp. diesel-electric passenger locomotives from Electro-Motive Corp.; New York, Susquehanna & Western four 1000-hp. diesel-electric units from American Locomotive Co.; New York, Ontario & Western five and Lehigh Valley three 44-ton diesel-electric switchers from General Electric Co., and the Navy one diesel-electric switcher from the Atlas Car & Mfg. Co.

Delaware, Lackawanna & Western bought 600 box cars and 250 gondolas from American Car & Foundry Co. and 400 box cars from the Magor Car Corp. The Reading placed 50 cement cars with company shops. Illinois Central is building two lounge cars for its own use, and Pullman-

Standard is building 20 cars for the Pullman Co.

Burlington has bought 30,000 tons of rails, distributed as follows: 7500 tons each from Inland and Carnegie-Illinois and 15,000 tons from the Colorado Fuel & Iron Co.; Rock Island has ordered 35,000 tons of rail, awarding 10,000 tons to Inland, 21,150 tons to Carnegie-Illinois and 3850 to Colorado Fuel & Iron.

(Continued on page 137)

Girdler Offers to Sign SWOC Contract

Washington

• • • The National Labor Relations Board on Tuesday announced the signing of a general agreement by it, Republic Steel Corp. and the CIO Steel Workers Organizing Committee, settling, subject to the approval of the third circuit court of appeals, all outstanding unfair labor practice cases involving the corporation. Announcement of the stipulation also was made by Chairman Tom Girdler of Republic who pointed out that the corporation agrees to recognize SWOC as an exclusive bargaining agency in any of its plants where the board certifies a majority of employees are members of the union in good standing.

"The agreement," said Mr. Girdler, "marks the union's first offer to submit proof of its membership in the company's plants. Membership in a plant will be established by union records checked against the company payrolls verified by the National Labor Relations Board.

"This procedure will eliminate the necessity of plant elections. It was adopted in the furtherance of collective bargaining in the plants and in the interests of national defense as it will avoid any interference with production which might result from plant electioneering campaigns.

"Republic is operating at top speed and a good share of its output is for defense needs. We want to avoid any letdown in production from any cause. In view of the claims of the SWOC that it now represents a majority of Republic's employees, the company believes that the orderly way to

determine the facts is through an investigation of membership records by the National Labor Relations Board.

"Consequently the company is prepared to deal with the SWOC as the exclusive bargaining agency for employees in plants where the union can prove and the National Labor Relations Board certify, that a majority are members in good standing of the union."

Great Lakes Steel Corp. Closed by Wildcat Strike

Detroit

• • • An unauthorized wildcat strike staged by a minority group of workers at Great Lakes Steel Corp. plants at Ecorse, Mich., early Tuesday morning closed the plant entirely, halting operation of the rolling mills, and causing a shut-down of all furnaces. The strike appeared to be an attempt to prevent signing of a contract negotiated between a local union of the Steel Workers Organizing Committee and officials of Great Lakes. The group staging the strike was alleged to be the same one which defied the labor conciliator, Thomas Dewey, and staged a similar unauthorized strike the first week of June.

Great Lakes in recent weeks had negotiated its first contract with the SWOC. This contract was approved in a secret ballot tabulated last Wednesday and was to have been signed on Wednesday, July 16.

The contract, due to be signed this week, was virtually the same

Warren, Ohio

• • • A mix up involving 10 foremen and about 20 employees caused a short lived outlaw strike at the Copperweld Steel Co. plant here early this week. Operations, it is said, were not affected.

as the contract negotiated at the time of the first strike. At that time, union officials, both local and international, declared that it was the best ever negotiated in the steel industry. At that time, only 625 men attended the mass meeting to consider the contract and they voted 328 to 240 against it. The recent secret ballot brought a vote of 2635 to 569 for the contract. About 8100 are employed at Great Lakes.

Non-Ferrous Metals

... MARKET ACTIVITIES AND PRICE TRENDS

••• Amendments to the general preference order M-9 on copper were issued this week by OPM, along with an order that for July the emergency pool will be 20 per cent of the April production. Included in the amendment to the copper order are: 1. controls to cover copper-base alloys and fabricated products made from copper or copper-base alloys. 2. grants of A-10 preference rating to all defense orders unless higher ratings are specifically assigned. 3. shipments of copper products to non-defense customers only after all defense orders have been provided for, and 4. allocations of copper by the Director of Priorities out of the emergency pool to meet urgent needs and allocations of all copper owned by the Metals Reserve Co.

A drop of 29,196 tons in domestic deliveries of refined copper to users was shown for the month of June, while deliveries of South American copper through the Metals Reserve Co. fell 17,523 tons to a total of 31,667 tons.

A meeting of OPM, OPACS, and representatives of the copper industry has been called for July 17 to discuss ways and means of increasing production of domestic copper and higher prices for high cost operators.

Prices remain unchanged with producers quoting 12c. a lb., Connecticut Valley and smelters, 12.50c. A little business in bonded copper was reported last week at 11c., f.a.s., New York.

Lead

Metals Reserve Co. and representatives of the Mexican, Canadian, and Peruvian lead producers are still negotiating a program of importing substantial tonnages of lead to the United States. While there seems to be no question but that the negotiators will come to satisfactory terms, there are many angles to the four country negotiation that must be cleared up.

This week's domestic lead mar-

ket is unchanged, with consumers requesting considerably more lead than producers are able to furnish. Prices hold at 5.70c., St. Louis, and 5.85c. a lb. at New York.

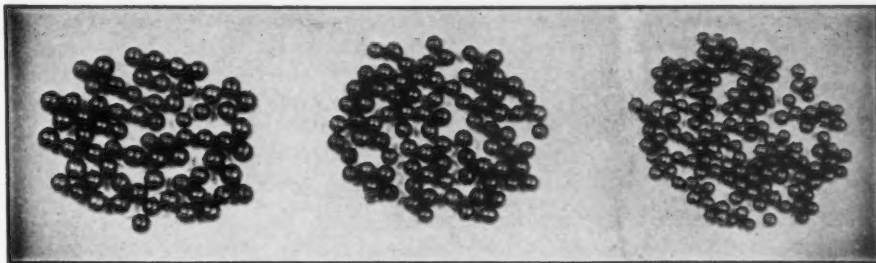
Zinc

While generally consumers' slab zinc stocks continue to decline, some consumers with large defense orders have been able to improve their supply situation. Tonnages are still being allocated far below actual requirements, with galvanizers being hard hit by the shortage of supplies due to the small part of their output finding its way into defense channels. Heavy production with possibly larger imports of foreign zinc are

forthcoming, but it will be several months before any marked improvements in supplies will be noticed. While refining capacity has been the chief bottleneck in zinc, increasing facilities in this direction call for a greater mine production, which however, is rising very slowly. Prices are unchanged, at 7.25c. a lb. East St. Louis, and 7.60c., New York.

Tin

The tin market this week has been very dull with prices advancing to a high of 53.625c. a lb. on Monday. This advance in prices is believed to be the result of British negotiations to furnish the Soviet with needed tin supplies.



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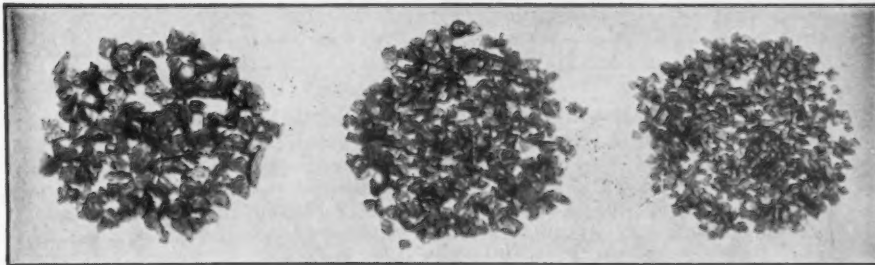
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Machine Tools

... SALES, INQUIRIES AND MARKET NEWS

Vacations Will Reduce Output Cincinnati

... With vacations in full swing this and next month, output of machine tool plants is expected to be lower than previous peak months. The feeling of improved well being, however, that will result among employees from these brief periods of relaxation, is felt will more than offset small fluctuations in actual output. With skilled labor supply very low and in fact almost zero, the high rate of production in district factories, where 10-hr. shifts have not been uncommon for six days a week, manpower has been pushed to great physical limits on the defense effort. As a result, management has by and large been carefully watching the situation and it has been largely the desire to keep physical and mental well being at a high pitch among workmen, that has held up adoption of a seven day week as a general rule in the industry. Of course, in some instances where temporary bottlenecks have developed, one or two departments have run seven day

weeks in order to keep the entire factory in operation.

The learner system is running smoothly and the development of green learners into efficient machine operators is working most satisfactorily.

Lull Continues in Buying

New York

... July business for dealers covering the immediate area is running below that of June, but there has been a steady gain in shipments into this territory. For one large dealer, shipments in June were 25 per cent over May, although a few large machines influenced this comparison to some extent. The same dealer's June orders were only slightly below those of May. Business is far from dull, however.

The bomber program has yet to be reflected in anything but aircraft instrument company expansions. Propulsion units for the Navy are calling for expansion of steam turbine and gearset manufacturing units of General Elec-

tric. Some very heavy equipment has been bought for this work in the recent past. One of the fastest moves noted on the part of a government shop was made in the last fortnight when one of the Army arsenals came into the market for a large quantity of machine tools needed to make anti-aircraft guns.

OPM has been calling upon machine tool dealers to furnish dollar-a-year technical men to work in the tool section. Dealers are forming regional groups and are contributing to a pool out of which the salaries of such men will be paid. So as not to keep a man away from his regular business too long, particularly for the smaller selling organizations, each man will serve only a three-month period in Washington. Dealer sales engineers are wanted by OPM because of their broader knowledge of machinery than specific tool manufacturing men and their knowledge of regional conditions.

President Asks \$8 Billions For Defense in Week

Washington

... An additional \$2,232,000,000 in cash and \$1,000,000,000 in contract authorizations, for the Navy and merchant marine were requested of Congress late last week by President Roosevelt. This brought to \$8,093,000,000 the defense appropriations and authorizations asked by the White House during the week.

Trade Notes

Metals Parts Machine Co. has moved its factory to 1742 Rivard Street, Detroit.

American Forging & Socket Co., Pontiac, Mich., has declared a dividend of 12½¢ a share, payable July 15 to stock of record July 9.

The district sales office of Republic Steel Corp. in St. Louis has been moved to 811 Shell Building, 13th and Locust Streets. J. B. Beyer is district sales manager.

T. G. Persson Co. has moved its office and factory to larger quarters at 224 Glenwood Avenue, Bloomfield, N. J.

June Gear Sales Set New Record



... Sales of industrial gears set a new all-time record in June, according to the American Gear Manufacturers Association. The gear sales index computed by the association rose to 299 in June from 273 in May and compares with the previous high of 292 in April. The average index for the first six months of the present year is 279 against an average of 144 in the corresponding period of 1940, a gain of 125 per cent. The gear index covers only industrial gears and does not include automotive gears or gears used in high speed turbines.

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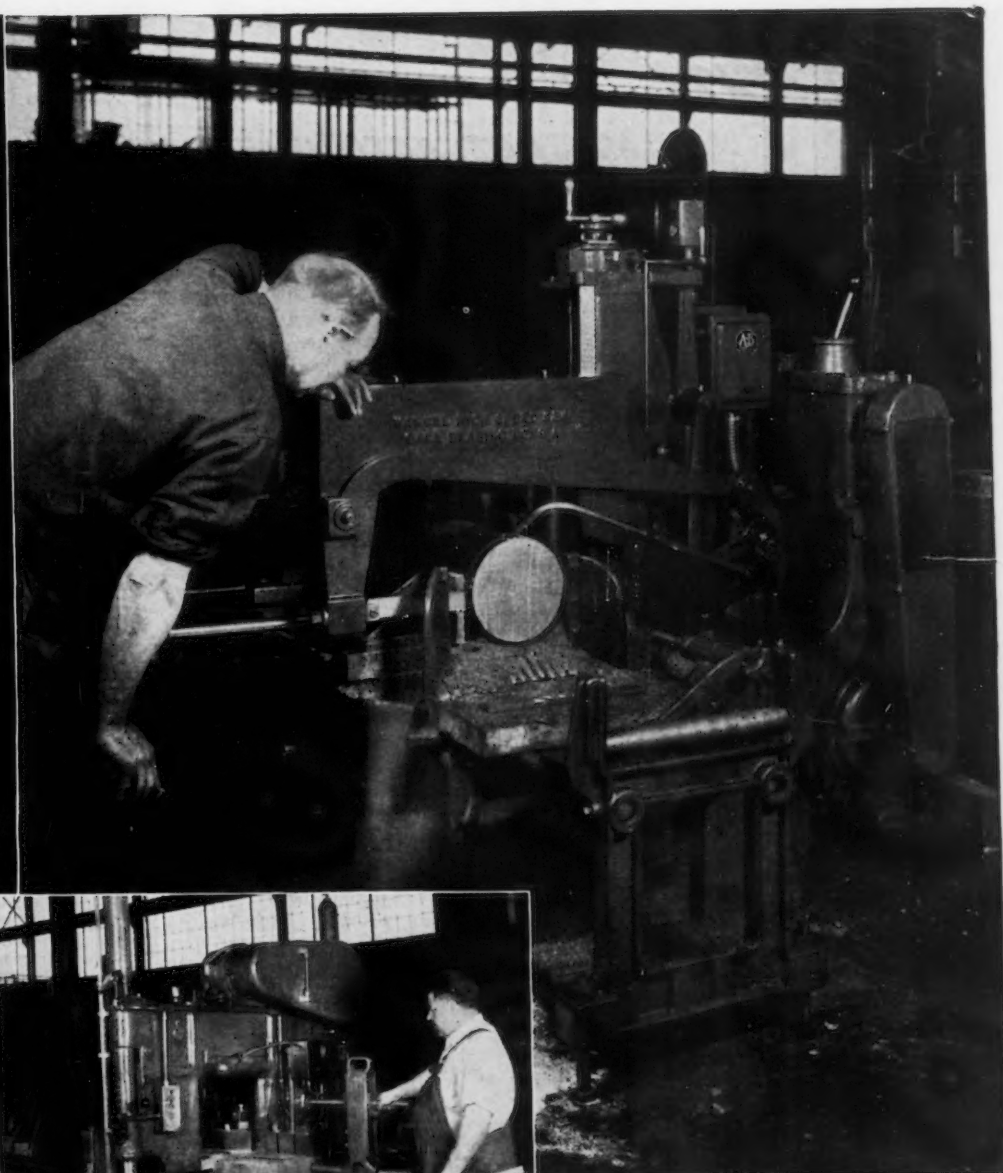
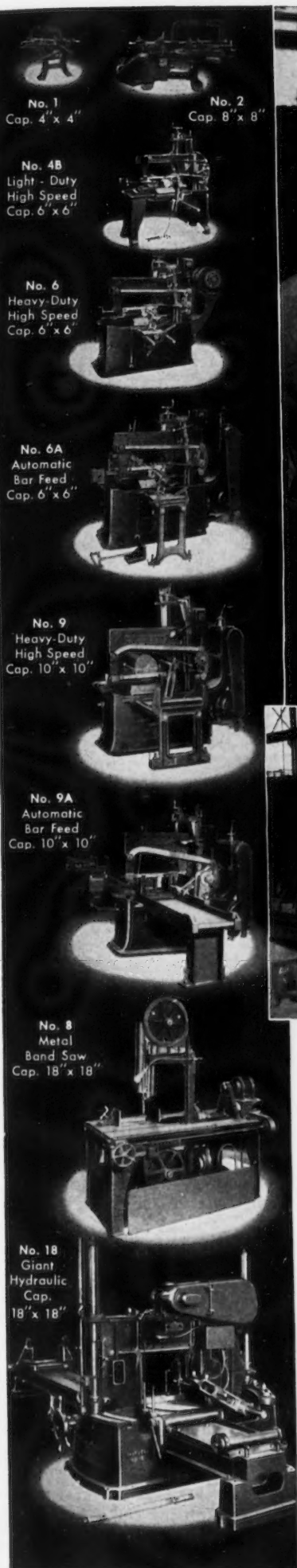
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Above. MARVEL 9A Automatic Production Saw

Left. MARVEL No. 18 Giant Hydraulic Hack Saw

At the Craine-Schrage Steel Company, as in modern plants everywhere, you'll find the Hack Saws are MARVELS

Add this Detroit plant to the long list of leading steel companies, forge shops and industrials that have standardized on MARVEL Metal-sawing Equipment. In this plant you will find: a MARVEL No. 18 Saw, MARVEL No. 9A and No. 6A Heavy-duty High Speed Saws, and a MARVEL No. 8 Band Saw. So it is in modern plants in all parts of the country—MARVEL Sawing Machines predominate.

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Scrap

... MARKET ACTIVITIES AND QUOTATION TRENDS

Detroit

• • • **Calling on OPM and OPACS** to take immediate steps to amplify the supply of scrap iron and steel and accelerate the flow of scrap from remote areas, the Institute of Scrap Iron and Steel moved formally in its mid-year convention here on Monday to demand action by the government as recommended more than a month ago in a report by a committee representing the scrap industry, steel mills and the government itself.

The action of the institute, on the opening day of its two-day meeting here, brought to light the fact that the OPM-OPACS scrap advisory committee report had been ignored when, on June 18, OPACS issued a new scrap price schedule.

The institute went on record, in a resolution telegraphed to Leon Henderson, Price Administrator, as giving unqualified approval and support to the report. It urged "adoption and implementation" as "the first step in a program to increase the supply of scrap and accelerate its flow to steel mills and foundries." Otherwise, it said, a shortage of scrap threatens loss of production of mills and foundries engaged in defense work.

While no statement was issued, it appears that the scrap industry rankles under the sting of the neglect evinced by OPACS after it apparently had "accepted" recommendations made by the special advisory committee. That committee, with representatives of the scrap industry and steel mills, also included official representatives of OPM, OPACS, the Army, Navy and conservation division. Its report was made June 10, was reviewed on June 11 by the government representatives, and approved by them. Sent to OPACS by the chairman, R. C. Allen, it apparently was shelved. Since then Allen has resigned from OPM, reportedly over this incident. On June 18 the new price schedule was issued, with provisions far different from those recommended in the report. It was learned that the industry's recommendations included the following:

1. Establishment of "remote" areas and \$12 price for heavy melting steel beyond a line west of the western boundaries of Minnesota, Iowa, Missouri, Arkansas and Louisiana. (Instead of this OPACS defined remote scrap as that originating beyond \$11.20 freight from Pittsburgh, thus effectively moving the boundary one tier of states westward and keeping western scrap out of the market, it is alleged.)

2. An accelerated campaign to wreck at least one million autos in "graveyards," above the 2,500,000 expected to be wrecked this year, was suggested. Ohio was named as a test state, with the campaign to be sponsored by OPACS, OPM, the auto industry and the scrap industry.

3. A national salvage week, to bring out an additional million tons of scrap. Proceeds to go to any cause named by the President of the United States. All scrap materials to be included, and to be

put into the regular channels of trade for processing, etc.

4. The industry calls for an end to direct dealing between producers and consumers of scrap. The government itself is accused of engaging in this practice, said to be of doubtful legality. C. A. Bishop, of OPACS, is reported to be in opposition to the practice of direct dealing.

5. Army and Navy called upon to halt their hoarding. Instances cited include navy yard offer to sell an excessive accumulation of aluminum.

6. The scrap industry calls upon those in charge of buying under the Lend-Lease Act to produce and show their schedule for six months to permit planning so scrap will not be taken needlessly from domestic consumers.

Nearly 200 attended the institute meeting here, making the session the best-attended mid-year convention on record, according to E. C. Barringer, executive secretary.



Responsibility For Scrap Shortage Placed Squarely Before OPACS

• • • **Action taken at Detroit** early this week brought out into the open a conflict long smoldering beneath the surface. Beset on one side by criticisms of failure to co-operate with the government stabilization schemes, the scrap trade is squeezed on the other side by heavy pressure from steel mills with record breaking requirements while at the same time the growth of direct dealing is acting to contract the trade's normal sphere of operation.

With the scrap shortage daily growing more severe, it is apparent that the responsibility for any curtailment of steel ingot output due to lack of scrap must now rest squarely with the government. While there have been sporadic departures from the OPACS scrap regulations, a large portion of which can be credited to the ambiguity surrounding the price control orders, these violations have not had any important effect upon

the flow of scrap. Leaders in the scrap trade, looking to the future, are sincere in their desire to devise methods of supplying the steel industry's tremendous needs without encouraging runaway prices. Thus when their recommendations, which do not involve any horizontal price increase, are ignored, it becomes apparent that the Government is assuming full responsibility for the scrap supply.

Meanwhile, despite charge and countercharge, the shortage of scrap is still the most serious threat to continued capacity ingot operations. The trek of steel mill officials to Washington to seek aid in finding scrap supplies is swelling. Thus far shifting of shipments from one plant to another has aided to balance the situation, but the supplies, especially in Ohio and Eastern Pennsylvania, are fast approaching a point where this method will no longer suffice.

As Revised by OPACS to June 25, 1941

Iron and Steel Scrap, other than Railroad Scrap

GRADES	Basing Points																			
	Pittsburgh Johnstown, Pa. Weirton, W. Va. Steubenville, O. Youngstown Warren, O. Sharon, Pa. Canton, O.	Chicago	Kokomo, Ind.	Bethlehem, Pa.	Claymont, Del.	Coatesville, Pa. Phoenixville, Pa. Harrisburg	Sparrows Point, Md.	Buffalo	Cleveland	Toledo, Ohio	Portsmouth, Ohio Middletown, Ohio Ashland, Ky.	St. Louis	Detroit	Duluth	Birmingham, Ala.	Chattanooga, Tenn.	Radford, Va.	Worcester, Mass. Bridgeport, Conn. Phillipsdale, R. I.	Los Angeles San Francisco Seattle	Minnequa, Colo.
No. 1 heavy melting	20.00	18.75	18.25	18.25	18.75	18.75	19.25	19.50	.....	19.50	17.50	17.85	18.00	17.00	.....	.....	.....	.....	14.50	16.50
No. 1 hydraulic compressed black sheet	20.00	18.75	18.25	18.25	18.75	18.75	19.25	19.50	.....	19.50	17.50	17.85	18.00	17.00	.....	.....	.....	.....	14.50	16.50
No. 2 heavy melting	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	.....	13.50	15.50
Dealers' No. 1 bundles	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	.....	13.50	15.50
Dealers' No. 2 bundles	18.00	16.75	16.25	16.25	16.75	16.75	17.25	17.50	.....	17.50	15.50	15.85	16.00	15.00	.....	.....	.....	.....	12.50	14.50
Mixed borings and turnings	15.25	14.00	14.25	13.50	14.00	14.00	14.50	14.75	.....	14.75	12.75	13.10	.....	12.25	.....	.....	.....	.....	9.75	11.75
Machine shop turnings	15.50	14.25	14.50	13.75	14.25	14.25	14.75	15.00	.....	15.00	13.00	13.35	15.50	15.00	.....	Alloy, W. Va. 17.50	.....	.....	10.00	12.00
Shoveling turnings	16.50	15.25	15.50	14.75	15.25	15.25	15.75	16.00	.....	16.00	14.00	14.35	16.50	.....	.....	.....	.....	.....	11.00	13.00
No. 1 busheling	19.50	18.25	17.75	17.75	18.25	18.25	18.75	19.00	.....	19.00	17.00	17.35	17.50	16.50	.....	.....	.....	.....	14.00	16.00
No. 2 busheling	15.50	14.25	13.75	13.75	14.25	14.25	14.75	15.00	.....	15.00	13.00	13.35	13.50	12.50	.....	.....	.....	.....	10.00	12.00
Cast iron borings	15.75	14.50	14.00	14.00	14.50	14.50	15.00	15.25	.....	15.00	13.25	13.60	13.75	12.75	.....	.....	.....	.....	10.25	12.25
Uncut structural and plate scrap	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	.....	13.50	15.50
No. 1 cupola	21.00	20.00	20.00	22.50	22.00	22.00	20.00	22.00	.....	21.00	20.00	20.35	18.00	20.00	20.50	21.00	22.00	.....	18.00	.....
Heavy breakable cast	19.50	18.50	18.50	21.00	21.50	21.00	18.50	20.50	.....	19.50	18.50	18.95	16.50	18.50	.....	.....	20.50	17.00	.....	.....
Stove plate	19.00	17.00	16.00	18.00	18.50	18.00	19.00	18.00	15.50	17.50	17.00	14.10	.....	17.00	17.50	18.00	14.00	14.00	11.25	.....
Low phos. billet and bloom crops	25.00	23.75	23.75	23.25	23.75	23.75	24.25	24.50	.....	23.50	22.50	22.85	23.00	22.00	.....	.....	.....	.....	.....	.....
Low phos. bar crops and smaller	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	.....	.....	.....
Low phos. punchings and plate scrap	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	.....	.....	.....
Machinery cast, cupola size	22.00	21.00	21.00	23.50	24.00	23.50	21.00	23.00	.....	22.00	21.00	21.35	19.00	21.00	21.50	22.00	23.00	19.00	.....	.....
No. 1 mach. cast, drop-broken, 150 lbs. and under	22.																			

⁶ Portsmouth, Ohio, price for this grade is \$15.25. Ashland, Ky., is not a basing point for this item.

(Delivered Consumers' Plants Located on Line of Railroad Originating Scrap—Per Gross Ton)

GRADES	Basing Points																								
	Pittsburgh	Sharon, Pa.	Wheeling, W. Va.	Steubenville, O.	Youngstown	Carlton, O.	Chicago	Kokomo, Ind.	Philadelphia	Wilmington, Del.	Sparrows Point	Cleveland	Buffalo	Portsmouth, O.	Middletown, O.	Ashland, Ky.	St. Louis	Kansas City	Detroit	Duluth	Birmingham, Ala.	Los Angeles	San Francisco	Seattle	Minneapolis, Colo.
No. 1 heavy melting	\$21.00						\$19.75	\$19.25	\$19.75	\$19.75	\$19.75	\$20.50	\$20.25	\$20.50			\$18.50	\$17.00	\$18.85	\$19.00	\$18.00	\$15.50			\$17.50
Scrap rails	22.00						20.75	20.25	20.75	20.75	20.75	21.50	21.25	21.50			19.50	18.00	19.85	20.00	19.00	16.50			18.50
Rerolling rails*	23.50						22.25	21.75	22.25	22.25	22.25	23.00	22.75	23.00			21.00	19.50	21.35	21.50	20.50	18.00			20.00
Scrap rails 3 ft. and under	24.00						22.75	22.25	22.75	22.75	22.75	23.50	23.25	23.50			21.50	20.00	21.85	22.00	21.00	18.50			20.50
Scrap rails 2 ft. and under	24.25						23.00	22.50	23.00	23.00	23.00	23.75	23.50	23.75			21.75	20.25	22.10	22.25	21.25	18.75			20.75
Scrap rails 18 in. and under	24.50						23.25	22.75	23.25	23.25	23.25	24.00	23.75	24.00			22.00	20.50	22.35	22.50	21.50	19.00			21.00

Where the railroad originator of the scrap operates in two or more of the basing points named in Schedule B, the highest of the maximum prices established for such basing points shall be the maximum price of the scrap delivered to a consumer's plant at any point on the railroad's line, except that Chicago consumers of scrap originating from railroads operating in Chicago are permitted to pay as much as 84c. a gross ton in switching charges above the maxima.

(A basing point includes its switching district.)

COMPUTING SHIPPING POINT PRICE: A shipping point is the point from which scrap is to be shipped to consumer and is calculated by subtracting the lowest established charge for transporting scrap from the shipping point to the nearest basing point. The following are exceptions: The shipping point price at any shipping point in New England, of those grades for which no prices are listed at the basing points established for New England, shall be the Johnstown basing point price, minus all-rail transportation costs from the New England shipping point to Johnstown. How-

BILLET AND BLOOM CROPS: Where such material originates in the Pittsburgh basing point, it may be sold delivered to a consumer within or without the Pittsburgh point at the price given in Schedule A, plus not more than \$2.50 in transportation charges. Lowest established transportation charges will govern.

Construction Steel

...STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

AWARDS

NORTH ATLANTIC STATES

- 695 Tons, New York, ventilation building, contract MHT-57, to American Bridge Co., Pittsburgh.
- 510 Tons, New York, seaplane hangar No. 2, La Guardia Field, to Harris Structural Steel Co., Plainfield, N. J.
- 300 Tons, Buffalo, crane runway for Buffalo General Electric Co., to R. S. McMannus Steel Construction Co., Buffalo.
- 240 Tons, Beckett, Mass., Main Street State bridge, to American Bridge Co., Pittsburgh.
- 200 Tons, Northbridge, Mass., Bean's Crossing State bridge, to American Bridge Co., Pittsburgh.
- 175 Tons, Niagara Falls, N. Y., plant addition for Republic Carbon Co., to Bethlehem Steel Co., Bethlehem, Pa., through DeHamel Contracting Co., Inc., Cleveland.
- 160 Tons, West Waterford, N. Y., Delaware & Hudson Railroad bridge, to American Bridge Co., Pittsburgh.
- 145 Tons, Shelton, Conn., New York, New Haven & Hartford Railroad bridge, to Phoenix Bridge Co., Phoenixville, Pa.
- 100 Tons, Fairview, N. J., bridge over New York, Susquehanna & Western Railroad, to American Bridge Co., Pittsburgh.

THE SOUTH

- 775 Tons, Rivesville, W. Va., power house extension, to Fort Pitt Bridge Works Co., Pittsburgh.
- 350 Tons, Tampa, Fla., power house for Tampa Electric Co., to Lehigh Structural Steel Co., Allentown, Pa.; Stone & Webster Engineering Co., New York, contractor.
- 187 Tons, Atlanta, Ga., three buildings for Army depot, to Ingalls Iron Works Co., Birmingham, through Beers Construction Co., Atlanta.

CENTRAL STATES

- 900 Tons, Kansas City, Kan., Kansas Power & Light Co. plant addition, to Kansas City Structural Steel Co., Kansas City, Kan.
- 475 Tons, Ramsey, Ill., and Charleston, Ill., Nickel Plate railroad bridges, Nos. 320.33 and 379.97, to American Bridge Co., Pittsburgh.
- 466 Tons, Kokomo, Ind., mill building for Continental Steel Corp., to Wisconsin Bridge & Iron Co., Milwaukee.
- 315 Tons, Cleveland, machine shop extension for diesel engine division of General Motors Corp., to Fort Pitt Bridge Works Co., Pittsburgh.
- 270 Tons, Stubblefield, Ill., State highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.
- 265 Tons, East Dubuque, Ill., bridges Nos. W-174-ON and W-174-OSO for Illinois

Central System, to American Bridge Co., Pittsburgh.

- 215 Tons, Kingsbury, Ind., three boiler houses for ordnance plant, to American Bridge Co., Pittsburgh.

- 125 Tons, Cleveland, addition to Melrose-Woodbine office building for Ohio Bell Telephone Co., to Fort Pitt Bridge Works Co., Pittsburgh.

WESTERN STATES

- 2000 Tons, Seattle, Wash., Army embarkation warehouse, to Bethlehem Steel Co., Seattle.
- 1000 Tons, Bremerton, Wash., quay wall at Navy Yard, to Columbia Steel Co. and Bethlehem Steel Co., divided equally.
- 500 Tons, Adelanto, Cal., building at air corps bomber base, to Pacific Iron & Steel Co., San Francisco.
- 300 Tons, Burbank, Cal., National Guard hangar, to Penn Iron & Steel Co., Los Angeles.
- 250 Tons, Oregon and Washington points, substation for Bonneville Power Authority, to Bethlehem Steel Co., Seattle.
- 115 Tons, Washington and Montana, bridges for Northern Pacific Railway, to American Bridge Co., Pittsburgh.
- 100 Tons, Oyster Bay, Wash., Naval store house and fuse building, to Isaacson Iron Works, Seattle, Wash.

PENDING STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

- 8500 Tons, Philadelphia, Southwark station for Philadelphia Electric Co.
- 2500 Tons, Niagara Falls, N. Y., addition to Bell Aircraft Corp. plant.
- 2000 Tons, Dunkirk, N. Y., mill buildings for Allegheny-Ludlum Steel Corp.; bids July 18.
- 1500 Tons, Brooklyn, terminal market buildings for city.
- 375 Tons, Dauphin County, Pa., State highway bridge.
- 300 Tons, Bayonne, N. J., garage, fire station and locomotive crane shed for Navy.
- 300 Tons, Newark, N. J., building for American Can Co.; Turner Construction Co., contractor.
- 220 Tons, Everett, Mass., building for Boston Consolidated Gas Co.
- 200 Tons, Niagara Falls, N. Y., building No. 12 for E. I. du Pont de Nemours & Co., Inc.
- 175 Tons, New York, building, East River Drive.
- 110 Tons, Brooklyn, gas tank foundation for Union Gas Co.
- 100 Tons, Buffalo, building for Hewitt Rubber Co.

CENTRAL STATES

- 515 Tons, Lincoln, Ill., State bridge route FA-5, section 23-XIF.
- 500 Tons, Racine, Wis., tractor warehouse for J. I. Case Co.
- 350 Tons, Connell, Kan., buildings for Boeing Airplane Co.

- 186 Tons, State of Missouri, highway bridges; bids July 25.

- 165 Tons, Mandan, N. D., State underpass FAGM-44-(2).

- 140 Tons, Milltown, Ind., State bridge, contract No. 2188.

- 105 Tons, Kingsbury, Ind., fuse line boiler house.

WESTERN STATES

- 2650 Tons, Ogden, Utah, air corps airplane repair shop, Hill Field.
- 250 Tons, Glacier County, Mont., Cut Bank Creek highway bridge; bids July 22.
- 115 Tons, Mountain Home, Idaho, warehouse for Bureau of Reclamation; specification 1530-D.

FABRICATED PLATES

AWARDS

- 3000 Tons, Longview, Wash., potshells for Reynolds Metal Co. plant, to Virginia Bridge Co., Roanoke, Va.

Reinforcing Steel

AWARDS

ATLANTIC STATES

- 700 Tons, Camden, N. J., New York Shipbuilding shipways, to Truscon Steel Co., Youngstown, through Leonard Shaffer.
- 500 Tons, Fort Howard, Baltimore, Veteran's Hospital buildings, to Bethlehem Steel Co., Bethlehem, Pa., through Auf-der-Heide-Aragona, contractor.
- 410 Tons, Brooklyn, Navy Yard, defense housing, to Fireproof Products Co.
- 360 Tons, Lakehurst, N. J., Naval base station facilities, to Bethlehem Steel Co., Bethlehem, Pa., through Kano Smith & Co., and Duffy Construction Co., contractors.
- 240 Tons, Springfield, Mass., Government storehouse to Truscon Steel Co., Youngstown, through Caspar Ranger Construction Co.
- 146 Tons, Morris County, N. J., mesh for Route 6, Sec. 21-A, to Truscon Steel Co., Youngstown, through Union Building & Construction Co.
- 120 Tons, Berlin, Conn., highway construction and overpass, the Bethlehem Steel Co., Bethlehem, Pa.; Digdini Arrigoni, contractor.
- 113 Tons, Andersons Corner, N. J., mesh for routes 33 and 35 connecting sections 1-a and 2, to Igoo Brothers, Brooklyn.

SOUTH AND CENTRAL

- 668 Tons, Tampa, Fla., bars and mesh for MacDill Field, to an unnamed bidder.
- 600 Tons, Dayton, Ohio, buildings at Wright Field, to Carnegie-Illinois Steel Corp., Pittsburgh, through National Concrete Fireproofing Co.

Weekly Bookings of Construction Steel

Week Ended	July 15, 1941	July 8, 1941	June 17, 1941	July 16, 1940	Year to Date	
					1941	1940
Fabricated structural steel awards	11,150	32,000	16,950	49,125	830,060	444,955
Fabricated plate awards	3,000	4,865	1,895	2,825	88,015	79,045
Steel sheet piling awards	0	0	0	4,510	17,945	25,925
Reinforcing bar awards	11,310	6,135	6,680	8,100	344,605	233,560
Total Letting of Construction Steel	25,460	43,000	25,525	64,560	1,280,625	783,485

- 250 Tons, Kenosha, Wis., America Brass Co. addition, to Truscon Steel Co., Youngstown, through Austin Co., Cleveland.
- 180 Tons, Chicago, WPA 57253, Lincoln Park, to Olney J. Dean Steel Co., Chicago.
- 160 Tons, Detroit, Distler Color Co., to Jones & Laughlin Steel Corp., Pittsburgh, through Taylor Gaskin, contractor.
- 145 Tons, Norton, W. Va., State highway bridge No. 1452, to an unnamed bidder, through Dodd & Archer, contractor.
- 130 Tons, Orleans, Neb., State highway project FAP-30 (A5), to Sheffield Steel Corp., Kansas City, Mo.
- 116 Tons, Talladega, Ala., powder magazines, to Truscon Steel Co., Youngstown, through Sullivan, Long & Haggerty & Algernon Blair.
- 105 Tons, Chicago, Church of Epiphany, to Olney J. Dean Steel Co., Chicago, through Henry Bros., contractors.

WESTERN STATES

- 2700 Tons, Bremerton, Wash., storehouse and sheds at Puget Sound Navy Yard to Northwest Steel Construction Co., Seattle, Wash.
- 2200 Tons, Bremerton, Wash., Navy Yard pier to Bethlehem Steel Co., Seattle, Wash.
- 335 Tons, Tacoma, Wash., Tacoma Indian Hospital, to Truscon Steel Co., Youngstown, through L. H. Hoffman.
- 260 Tons, Oakland, Cal., Lockwood Gardens housing project, to Gilmore Steel Fabricators, Inc., San Francisco.
- 115 Tons, Big Blackfoot River, Mont., highway bridge, to Missouri Valley Bridge & Iron Co., by Portland Bridge Co., Leavenworth, Kans.

PUERTO RICO

- 750 Tons, San Juan, Puerto Rico, Army base warehouse and bridges, to Truscon Steel Co., Youngstown, through Paul Smith Construction Co.

PENDING REINFORCING BAR PROJECTS ATLANTIC STATES

- 10,000 Tons, Kendaia, N. Y., government ordnance storage depot; Poirier & McLane, contractor.
- 500 Tons, Pittsburgh, River Front Boulevard, contract 11; bids July 22.
- 500 Tons, Hingham, Mass., government ammunition depot.
- 170 Tons, Lowell, Mass., two pumping stations and two dikes for U. S. Engineers; bids taken July 16.

SOUTH AND CENTRAL

- 1700 Tons, Jeffersonville, Ind., flood wall for U. S. Engineers; bids July 24.
- 200 Tons, Alpena, Mich., high school; Spence Brothers, contractors.
- 200 Tons, Milwaukee, Falk Corp. expansion; Klug & Smith Co., contractor.
- 155 Tons, Chicago, American Medical Association building; George A. Fuller Co., contractor.
- 100 Tons, Norfolk, Va., Navy Yard power plant; Burns & Roe, contractors.

WESTERN STATES

- 184 Tons, Portland, Ore., subway structure Front Avenue highway, bids July 17.
- 172 Tons, Helena, Mont., highway structures, bids July 22.

Cast Iron Pipe

• Peshtigo, Wis., plans pipe lines for water system and other waterworks installation. Cost close to \$60,000. Special election will be called soon to approve project. A. E. McMahon Engineering Co., Menasha, Wis., is consulting engineers.

Rossville, Kan., has engaged Paulette & Wilson, 1006 Kansas Avenue, Topeka, Kan., consulting engineers, to make surveys and estimates of cost for pipe lines for water system and other waterworks installation.

Plymouth, Ind., plans pipe line extensions and replacements in water system, and other waterworks improvements. Cost close to \$75,000.

Bedford, Ky., plans pipe lines for water system and other waterworks installation. Cost about \$55,000.

King County Water District No. 62, Earlington Heights, care of Gardner, Gardner & Hitchings, Arctic Building, Seattle, consulting engineers, has plans for water system, using 4 and 6-in. pipe for main distribution lines.

Cost about \$47,000. Financing in part is being arranged through Federal aid.

Pinehurst Water District, Everett, Wash., plans pipe line extensions and replacements in water system, and other waterworks improvements. Cost about \$75,000. Special election has been called July 26 to vote bonds in that amount.

City Water Board, Bellingham, Wash., George Brock, water superintendent, plans about 5800 ft. of 12-in. pipe for main water line in Eldridge Avenue, from H Street to Squalicum Creek.

North Muskegon, Mich., plans about 2000 ft. of pipe for extensions in main water line in Cedar Street. A. E. Hansen is city engineer in charge.

Pipe Lines

• **Mountain Fuel Supply Co., Inc.**, 36 South State Street, Salt Lake City, Utah, has approved plans for new 8½-in. welded steel pipe line between Powder Wash and Hiawatha gas field areas, Moffat County, Colo., about 18 miles, for natural gas transmission, connecting both districts with main pipe line. Cost about \$250,000. Pipe installation will be carried out under direction of Thomas Jenks, Casper, Wyo.

Kaw Pipe Line Co., Bartlesville, Okla., operated jointly by Cities Service Oil Co., Texas Co., and Phillips Petroleum Co., plans new 10-in. welded steel pipe line from Chase, Kan., to Susank, Kan., about 30 miles, for crude oil transmission. New line will connect present 8-in. pipe line gathering system in oil field districts in Russell and Ellis Counties, Kan., with main pipe line at Chase. Booster pumping station will be installed.

Bureau of Reclamation, Denver, asks bids until July 28 for steel pipe, fittings, valves, etc., for Parker hydroelectric power plant, Parker Dam power project (Specification 1529-D); until July 30 for one steel turbine inlet pipe for unit A-5, Boulder hydroelectric power plant, Boulder Canyon project (Specification 1535-D).

Department of Supplies and Purchases, City Hall Annex, Philadelphia, Charles H. Grakelow, director, asks bids until July 22 for steel pipe (Class 439).

United States Engineer Office, Federal Building, Detroit, has let contract to Aqua Systems, Inc., 385 Gerard Avenue, New York, at \$74,717 for pressure pipe line system for gasoline fueling at airport at Fort Wayne, Ind.

Tennessee Gas & Transmission Co., Chattanooga Bank Building, Chattanooga, Tenn., Curtis B. Dall, president, plans new 16-in. welded steel pipe line from gas field in Louisiana to Alcoa, Tenn., and vicinity, for natural gas transmission. Service will be furnished to mill of Aluminum Co. of America, Inc., Pittsburgh, at terminus noted, where control and meter station will be located. This is part of project of company covering two lines of size noted from Louisiana fields to points in Tennessee and thence to Asheville, N. C. Lines will pass through northern Mississippi and northern Alabama, with service to be furnished over 50 communities and industrial plants in entire territory. Federal Power Commission will soon pass on application for approval of project, which has been recommended for favorable action by Tennessee Utilities Commission. Cost about \$20,000,000 with booster and meter stations, and other operating facilities.

Pennsylvania Electric Co., Johnstown, Pa., plans extensions in 4 and 6-in. local pressure pipe lines for gas transmission in vicinity of Strayer Street, Chandler Avenue and other thoroughfares. Cost over \$45,000.

United States Engineer Office, Post Office Building, Sacramento, Cal., has low bid at \$97,185 from Central California Construction Co., 115 Burrows Street, San Francisco, for pressure pipe line system for gasoline fueling at flying field No. 2, near Bakersfield, Cal. (Circular 268).

Market News . . .

(Continued from Page 130)

Reinforcing Steel

. . . Awards and new inquiries show sharp rise this week

Reinforcing steel awards are higher this week at 11,310 tons and include 2700 tons for a storehouse and sheds for the Puget Sound Navy Yard, Bremerton, Wash., and 2200 tons for a navy yard pier at Bremerton. New reinforcing steel projects of 25,185 tons are swelled by 10,000 tons for a government ordnance storage depot at Kendaia, N. Y. The only other inquiry of size is 1700 tons for a flood wall at Jeffersonville, Ind., for U. S. Engineers.

Merchant Bars

. . . Shipments to shell loading plant to 16,000 tons

Indicative of the way in which defense projects have increased in size, shipments to the new Ravenna, Ohio, shell loading plant near CLEVELAND, originally estimated at 4500 tons, are reported to have gone over the 16,000-ton mark.

An analysis of one steel company's books in the PITTSBURGH area discloses that approximately 90 per cent of July's shipments will carry priority or preference ratings above A-3. There are also indications that August shipments will run as high as 85 per cent, direct and indirect defense.

Tubular Goods

. . . Specifications heavy for oil country goods

Placement of oil-country goods specifications remains heavy, although it is admitted by some companies that many of these specifications will have to be pushed back in order to make room for items carrying defense ratings or products covered by OPACS allocation programs. Inventories of oil-country goods in consumers hands are said to be substantial but somewhat spotty, with some large companies having heavy stocks and other concerns having only a small amount of supplies on hand.

Sales of pipe have increased sharply in the CHICAGO district. A number of good sized tonnages are being turned down because of the shortage of spelter.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product	DELIVERED TO														
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes ²	3.80¢		3.80¢									4.55¢			
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE															
Standard cokes (Per 100-lb. base box)	\$5.00	\$5.00	\$5.00						\$5.10						
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (¹⁰)			
TERNES, MFG.															
Special coated (Per base box)	\$4.30		\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.40¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)						
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ (¹¹)		(Coatesville and Claymont = 2.10¢)	2.45¢	2.65¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)										
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)							
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)							
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)							
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)							
WIRE⁹															
Bright	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)							
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)							
Spring	3.20¢	3.20¢		3.20¢				(Worcester = 3.30¢)							
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			
IRON BARS															
Common		2.25¢			(Terre Haute, Ind. = 2.15¢)										
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only. 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to 29 gage within certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ Boxed. ¹¹ Ship plates only.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton

Rerolling\$34.00
Forging quality 40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

Per Gross Ton

3 in. to 12 in.\$52.00
12 in. to 18 in. 54.00
18 in. and over..... 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer.....\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.
9/32 in. to 47/64 in., \$3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)
20x14 in. 20x28 in.

8-lb. coating I.C...	\$6.00	\$12.00
15-lb. coating I.C...	7.00	14.00
20-lb. coating I.C...	7.50	15.00
25-lb. coating I.C...	8.00	16.00
30-lb. coating I.C...	8.63	17.25
40-lb. coating I.C...	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails.....\$2.55
Coated nails 2.55
Cut nails, carloads 3.85

Base per 100 Lb.

Annealed fence wire.....\$3.05

Base Column

Woven wire fence*..... 67
Fence posts (carloads)..... 69
Single loop bale ties.....59
Galvanized barbed wire†..... 70
Twisted barbless wire..... 70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:
½ in. and smaller by 6 in. and shorter65½
9/16 and ¾ in. by 6 in. and shorter63½
¾ to 1 in. by 6 in. and shorter.61
1½ in. and larger, all lengths..59
All diameters over 6 in. long..59
Lag, all sizes62

Plow bolts65
Nuts, cold punched or hot pressed, hex. or square:
½ in. and smaller.....62
9/16 to 1 in. inclusive.....59
1½ to 1½ in. inclusive.....57
1½ in. and larger.....56

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts U.S.S. S.A.E.

7/16 in. and smaller...	64
½ in. and smaller.....	62
½ in. through 1 in....	60
9/16 to 1 in.....	59
1½ in. through 1½ in. 57	58
1½ in. and larger.....	56

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Stove bolts in packages, with nuts attached71
Stove bolts in bulk.....80

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham\$3.75

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller 64
Upset set screws, cup and oval points 71
Milled studs 46
Flat head cap screws, listed sizes 36
Filister head cap screws, listed sizes 51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	July 9	July 10	July 11	July 12	July 14	July 15
Copper, Electrolytic¹	12.00	12.00	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York²	53.25	53.25	53.375	....	53.625	53.50
Zinc, East St. Louis	7.25	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis³	5.70	5.70	5.70	5.70	5.70	5.70

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits, pig	54.50	55.00
Copper		
Electro	13.00	13.25
Castings	12.50	13.15
H. R. Sheets*	20.87	20.87
Seamless tubes*	21.37	21.37
Brass		
Yellow sheets*	19.48	19.48
Yellow, rods*	15.01	15.01
Seamless tubes*	22.23	22.23
Zinc		
Slabs	Nom'al	Nom'al
Sheet, No. 9 casks.	Nom'al	Nom'al
Lead		
American pig	6.85	6.35
Bar	8.70	8.85
Cut sheets	9.00	91.0
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt, 98-99%	18.00	18.50
Solder		
½ and ½	33.00	32.75
Babbitt		
Anti-friction grade	23.50	21.75

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	11.00	11.625
Hvy. and wire	10.00	10.50
Light and bottoms	8.75	9.25
Brass		
Heavy	6.25	6.75
Light	5.25	6.00
No. 1 yel. turn	6.00	6.50
No. 1 red or compo. turnings	9.75	10.75
Hvy. Mach. compo.	10.00	10.25
Lead		
Heavy	5.00	5.50
Aluminum		
Cast	11.00	12.00
Sheet	12.00	13.50
Zinc		5.10

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 16c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$190, per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33½; on brass sheets and rods, 40; on brass tubes, 33½, and copper tubes, 40.

PRICES

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....\$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade2.70c.
Delivered, Detroit2.80c.

S.A.E. Alloy Differential,
Series per 100 Lb.
Numbers
2000 (1.5 Ni)\$0.35

2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)..	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)..	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)...	2.60
6100 Cr-V bar	1.20

C-V	0.85
6100 Cr-V spring steel	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c. carlots.

Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.
Open hearth grade3.50c.



"BUSIEST MACHINE IN OUR SHOP"

So writes H. L. Fisher Mfg. Co. of Chicago about their DoAll.

"We build many special machines and our DoAll is in constant use. We can do more different types of machining on the DoAll than on any other two machine tools.

"The large 2" tool steel die sections were done in 1/8th

the time it would have taken with other methods. The amount of steel we saved more than paid the operator's time.

"Any company working in metal and endeavoring to do machine work without a DoAll is *throwing profits out of the window*. To our way of thinking, you have developed the finest new item in machine tools in several years."

'NUF SED...

Modesty prevents our adding anything to the above except this—If you work with metal, make or shape or repair metal products or machinery—you'll find the DoAll a time, labor and money saver. Takes the place of shaper, milling and lathe work on hundreds of jobs and does internal and external sawing, filing and polishing faster and better.

Let our man come to your factory with a DoAll and show you what it can do and save for you.

CONTINENTAL MACHINES, INC.

1311 S. Washington Ave.

Minneapolis, Minn.

Associated with the Doall Company, DesPlaines, Ill., Manufacturers of Band Saws and Band Files for Doall Contour Machines.



FREE — Literature and 158-page Handbook on Contour Machining.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip.....	23.50c.	21.50c.
Cold rolled strip.....	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35.00c.
C'd st.....	22.00c.	22.50c.	32.00c.	52.00c.

20% Chromium-Nickel Clad Steel

No.	304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

TOOL STEEL

(F.o.b. Pittsburgh)

	<i>Base per Lb.</i>
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	<i>Base per Lb.</i>
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

PRICES

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago..	\$54.80
5-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham..	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall
(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Lap Weld Hot Rolled
1 in. o.d. 13 B.W.G.	\$9.01	\$7.82
1 1/4 in. o.d. 13 B.W.G.	10.67	9.26
1 1/2 in. o.d. 13 B.W.G.	11.70	10.23
1 3/4 in. o.d. 13 B.W.G.	13.42	11.64
2 in. o.d. 13 B.W.G.	15.03	13.04
2 1/4 in. o.d. 13 B.W.G.	16.76	14.54
2 1/2 in. o.d. 12 B.W.G.	18.45	16.01
2 3/4 in. o.d. 12 B.W.G.	20.21	17.54
3 in. o.d. 12 B.W.G.	21.42	18.59
3 1/2 in. o.d. 11 B.W.G.	22.48	19.50
4 in. o.d. 11 B.W.G.	24.62	23.15
4 1/2 in. o.d. 10 B.W.G.	28.37	24.62
5 in. o.d. 10 B.W.G.	30.54	28.66
5 1/2 in. o.d. 10 B.W.G.	35.20	30.54
6 in. o.d. 9 B.W.G.	43.04	37.35
6 1/2 in. o.d. 9 B.W.G.	44.25	46.87
7 in. o.d. 7 B.W.G.	54.01	46.87
8 in. o.d. 7 B.W.G.	82.93	71.96

Extras for less carload quantities:	Base
40,000 lb. or ft. over	5%
30,000 lb. or ft. to 39,999 lb. or ft.	10%
20,000 lb. or ft. to 29,999 lb. or ft.	20%
10,000 lb. or ft. to 19,999 lb. or ft.	30%
5,000 lb. or ft. to 9,999 lb. or ft.	45%
2,000 lb. or ft. to 4,999 lb. or ft.	65%
Under 2,000 lb. or ft.	

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price = \$200 Per Net Ton
Butt Weld

Steel	Black	Galv.
1/8 in.	56	33
1/4 to 3/8 in.	59	40 1/2
1/2 in.	63 1/2	51
3/4 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

Wrought Iron	Black	Galv.
1/4 and 3/8 in.	+9	+33
1/2 in.	24	3 1/2
3/4 in.	30	10
1 and 1 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

Lap Weld

Steel	Black	Galv.
2 in.	61	49 1/2
2 1/2 and 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2
7 and 8 in.	65	52 1/2
9 and 10 in.	64 1/2	52
11 and 12 in.	63 1/2	51

Wrought Iron	Black	Galv.
2 in.	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17
9 to 12 in.	28 1/2	12

Butt weld, extra strong, plain ends

Steel	Black	Galv.
1/8 in.	54 1/2	38 1/2
1/4 to 3/8 in.	56 1/2	42 1/2
1/2 in.	61 1/2	50 1/2
3/4 in.	65 1/2	54 1/2
1 to 3 in.	67	57

Wrought Iron

1/4 and 3/8 in.	+10	+46
1/2 in.	25	6
3/4 in.	31	12
1 to 2 in.	38	19 1/2

Lap weld, extra strong, plain ends

Steel	Black	Galv.
2 in.	59	48 1/2
2 1/2 and 3 in.	63	52 1/2
3 1/2 to 6 in.	66 1/2	56

	Black	Galv.
7 and 8 in.	65 1/2	53
9 and 10 in.	64 1/2	52
11 and 12 in.	63 1/2	51

Wrought Iron

2 in.	33 1/2	15 1/2
2 1/2 to 4 in.	39	22 1/2
4 1/2 to 6 in.	37 1/2	21
7 and 8 in.	38 1/2	21 1/2
9 to 12 in.	32	17 1/2

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

I NEED

Balance

IN SKATING



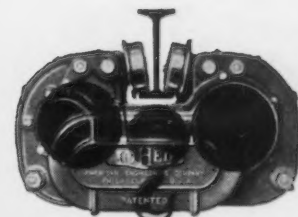
"I NEED BALANCE IN SKATING" says Bess Ehrhardt, lovely Star of the 1941 Ice Follies

AMERICAN ENGINEERING COMPANY

The Lo-Hed Hoist is applicable to any monorail system — There's a balanced Lo-Hed electric hoist for every purpose

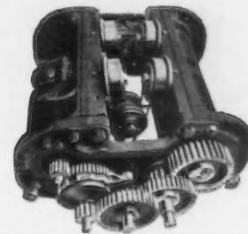
OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, HELE-SHAW FLUID POWER

Look in your Classified Telephone Directory under "A-E-CO LO-HED HOISTS" for your nearest representative



You Need BALANCE in a HOIST

LO-HED, the Balanced Hoist. It's balance that makes the difference between a Lo-Hed and any other hoist. In this different hoist the motor and drum are on opposite sides of the beam. The hook goes up so close to the beam you can scarcely jam your thumb between. You get a compact, balanced hoist, minimum headroom, efficient spur gearing, and a sturdy frame, plus all the practical features a hoist should have. A Lo-Hed is worth a few dollars more but it will make a difference in your operating and maintenance costs. Look at a Lo-Hed and you won't have to look further. Write for Lo-Hed catalog today.



LOOK AT THE BALANCED LO-HED!

It Costs Less to Operate—All gears are efficient stub-tooth spur gears running in a sealed oil bath . . . gear shafts and trolley wheels are equipped with heavy-duty ball or roller bearings.
It Costs Less to Maintain—Sturdy construction . . . seldom, if ever, requires removal from rail . . . covers of controller, motor, drum and gearing are easily removed.
It's Safe—Factor of safety of over 5 at full capacity . . . 100% Positive Automatic Stop when load reaches upper limit . . . Automatic Holding Brake prevents load from drifting when current is shut off . . . short, strong shafts minimize torsional stresses.
It's Protected—Controller is fire, dust and moisture proof . . . motor totally enclosed . . . gearing sealed in . . . motor and drum covered by easily removable covers.

AMERICAN ENGINEERING CO.

2410 Aramingo Avenue, Philadelphia

☐ Please send me your complete catalog of LO-HED HOISTS.

☐ Ask your representative to get in touch with me promptly.

Name

Company

Street Address

City..... State.....

(Please print plainly)

PRICES

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50% ..	\$4.75
Old range, non-bessemer, 51.50% ..	4.60
Mesaba, bessemer, 51.50% ..	4.60
Mesaba, non-bessemer, 51.50% ..	4.45
High phosphorus, 51.50% ..	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore,
Exclusive of Duty

Per Unit

African, Indian, 44 to 48% Mn.	61c. to 65c.
--------------------------------	--------------

African, Indian, 49 to 51% Mn.

71c. to 72c.

Brazilian, 46 to 48% Mn..69c to 70c.

Cuban, del'd, duty free, 51% Mn.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....	\$24 to \$25
Tungsten, domestic, scheelite, delivered	\$24 to \$25
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton; South Cuban, 32%	\$18.00
Indian, 48-50%	\$38 to \$40
Rhodesian, 48%	\$35 to \$40

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton.....	\$40.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	\$40.00
Light rails (from rail steel), gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast.....	2.30c.
Track bolts, steam railroads...	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....	\$20.00 to \$21.00
Domestic, f.o.b. Ohio River land- ing barges	20.00 to 21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines.....	20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid.....	Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illi- nois and Kentucky mines....	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick Per 1000 f.o.b. Works	
Super-duty brick at St. Louis..	\$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	51.30
First quality, New Jersey.....	56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri, and Illinois	46.55
Second quality, New Jersey....	51.00
No. 1 Ohio.....	39.96
Ground fire clay, per ton.....	7.60

Silica Brick	
Pennsylvania	\$51.30
Chicago District	58.90
Birmingham	51.30
Silica cement, net ton (Eastern)	9.00

Chrome Brick Net per Ton	
Standard f.o.b. Baltimore, Plym- outh Meeting and Chester...	\$54.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa.	54.00

Magnesite Brick	
Standard f.o.b. Baltimore and Chester	\$76.00
Chemically bonded, f.o.b. Balti- more	65.00

Grain Magnesite	
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks.....	\$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

**How to determine where
Overhead Materials Handling Equipment
Can be Used Profitably**

**THIS New Booklet
GIVES A CLEAR, CONCISE
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MATERIALS HANDLING**

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Numerous pictures and drawings give you the elements of Tramrail materials handling equipment and illustrate typical plant layouts of actual applications. This booklet starts your train of thought and carries you through the steps necessary to determine where and what equipment might be used profitably.

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OVERHEAD MATERIALS HANDLING EQUIPMENT
Other products: CLEVELAND CRANES and STEELWELD MACHINERY

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....\$120.00
Domestic, 78-82%, carlots, f.o.b.

Tennessee furnaces 145.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00

Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered Lump Size

50% (carload lots, bulk).....\$74.50*

50% (ton lots, packed)..... 87.00*

75% (carload, lots, bulk)....135.00*

75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....\$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, Silicon 6.00 to 6.50%

Jackson, Ohio\$29.50*

Buffalo, N. Y. 30.75*

For each additional 0.25% silicon up to 10%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Manganese, each 0.50% over 2%, 50c. a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

*Official maximum prices established by OPACS on June 25.

Ferrocchrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.

2% carbon17.50c.

1% carbon18.50c.

0.10% carbon20.50c.

0.06% carbon21.00c.

Spot prices are ¼ c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon\$113.00*

2.50% carbon 118.00*

2% carbon 123.00*

1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... \$2.00

Ferrotungsten, 100 lb. and less 2.25

Ferrovandium, contract, per lb. contained V, del'd \$2.70 to \$2.90†

Ferrocolumbium, per lb. contained columbium f.o.b.

Niagara Falls, N. Y., ton lots \$2.25†

Ferrocantitanium, 15 to 18% Ti, 7 to 8% C. f.o.b.

furnace carload and contract, per net ton.....\$142.50

Ferrocantitanium, 17 to 20% Ti, 3 to 5% C. f.o.b.

furnace, carload and contract per net ton.....\$157.50

Ferrophosphorus, electric or blast furnace material, in

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., 24% per gross ton, \$3 unitage, freight equalized with Nashville 75.00

Ferromolybdenum, per lb. Mo., f.o.b. furnace 95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace 80c.

Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.
Molybdenum oxide, in cans, per lb. of contained Mo, f.o.b. Washington, Pa. 80c.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J....4.90c.
No. 6, f.o.b. Bayonne, N. J....3.21c.
No. 5 Bur. Stds., del'd Chicago...3.25c.
No. 6 Bur. Stds., del'd Chicago...2.75c.
No. 3 distillate, del'd Cleveland...6.25c.
No. 4 indus., del'd Cleveland...5.75c.
No. 5 indus., del'd Cleveland...5.375c.
No. 6 indus., del'd Cleveland...5.00c.

Maintain **PEAK** capacity... WITH **BRASSERT CONSTRUCTION HOT BLAST STOVES**



View of Brassert Hot Blast Stove, showing construction of checkers and checker walls.

Here are four definite advantages you get in Brassert Construction Hot Blast Stoves:

1. High blast temperature when needed.
2. Large capacity for heat storage.
3. High thermal efficiency.
4. Unequalled capacity in a given stove shell.

These advantages are assured because Brassert, through correct application of engineering principles, has been able to provide: maximum weight and surface of brick per unit of stove volume; heating surface close to mass of brick; air and gas passages close to heating surface; velocity of air and gas maintained uniform and at a maximum throughout of stove.

H.A. BRASSERT & CO.

Engineers and Contractors

FIRST NATIONAL BANK BUILDING, PITTSBURGH, PA.
80 EAST 42nd STREET, NEW YORK CITY

PRICES

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt	\$6.00 to \$6.25
Foundry, f.o.b. Connellsville, prompt	\$6.75 to \$7.00
F'dry, by-product, Chicago.....	10.50
F'dry, by-product, New England	13.75
Foundry, by-product, Newark or Jer- sey City	\$12.45 to 12.95
F'dry, by-product, Philadelphia.	12.13
F'dry, by-product, Cleveland...	12.30
F'dry, by-product, Cincinnati...	11.75
Foundry, Birmingham	8.50
F'dry, by-product, St. Louis	
	\$10.75 to \$11.00

BRITISH

Per Gross Ton, f.o.b. United Kingdom
Ports

Ferromanganese, export £29	16s. 3d.
Tin plate, per base box.	32s. to 33s.
Steel bars, open hearth...	£16 10s.
Beams, open hearth...	£19 10s.
Channels, open hearth...	£19 10s.
Angles, open hearth...	£15 10s.
Black sheets, No. 24, gage	
£22 5s. max.* £22 5s. min.**	
Galvanized sheets, No. 24 gage	
£25 12s. 6d max.*; £25 12s. 6d.	
min.**	

*Empire markets only.

**Other than Empire markets.

PIG IRON (Per Gross Ton)

All prices set in bold face type are maxima established by OPACS on June 24. Other domestic prices are delivered quotations computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	\$25.50	\$25.00	\$26.50	\$26.00	.....
Brooklyn	27.50	.....	.....	28.00	.....
Jersey City	26.53	26.03	27.53	27.03	.....
Philadelphia	25.84	25.34	26.84	26.34	.....
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....
Steelton, Pa. ....	.....	24.50	.....	.....	29.50
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50
Sparrows Point, Md.	25.00	24.50	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....
Buffalo	24.00	23.00	25.00	24.50	29.50
Cincinnati	24.44	24.61	.....	25.11	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....
St. Louis	24.50	24.02	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....
Granite City, Ill.	24.00	23.50	24.50	24.00	.....
Cleveland	24.00	23.50	24.50	24.00	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....
Toledo	24.00	23.50	24.50	24.00	.....
Youngstown*	24.00	23.50	24.50	24.00	.....
Detroit	24.00	23.50	24.50	24.00	.....
St. Paul	26.63	.....	27.13	26.63	.....
Duluth	24.50	.....	25.00	24.50	.....
Birmingham	20.38	19.00	25.00	.....	.....
Los Angeles, San Fran- cisco and Seattle	27.50	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....
Toronto	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fee.....**\$23.50**

CHARCOAL

Lake Superior fee.....**\$28.00**
Lyles, Tenn, high phos. fee.....**28.50**
Lyles, Tenn., low phos. fee.....**33.00**
Delivered Chicago.....**31.34**

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

WAREHOUSE PRICES

	Pitts- burgh	Chicago	Cleve- land	Phila- delphia	New York	Detroit	Buffalo	Boston	Birm- ingham	St. Louis	St. Paul	Mil- waukee	Los Angeles
Sheets, hot rolled	\$3.35	\$3.05	\$3.35	\$3.75	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.30	\$3.38	\$5.10
Sheets, cold rolled .....	.....	4.10	4.05	4.05	4.60	4.30	4.30	3.68	.....	4.12	4.35	4.23	7.30
Sheets, galvanized	4.75	4.60	4.62	5.00	5.00	4.84	4.75	5.11	4.75	4.24	4.75	4.98	6.30
Strip, hot rolled	3.60	3.40	3.50	3.95	3.96	3.68*	3.82	4.06	3.70	4.99	3.65	3.73	.....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.20	3.52	3.46	.....	3.61	3.83	3.54	.....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.95
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.95
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	**4.15
Bars cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.	7.20	7.10	7.55	7.31	7.60	7.67	7.35	7.50	.....	7.72	7.45	7.58	10.35
Bars, ht. rld. SAE 3100.	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	9.35
Bars, cd. drn. SAE 2300.	8.15	8.15	8.40	8.56	8.84	8.70	8.40	8.63	.....	8.77	8.84	8.63	11.35
Bars, cd. drn. SAE 3100.	6.75	6.75	7.75	7.16	7.18	7.05	6.75	7.23	.....	7.12	7.44	6.98	10.35

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lbs.; Los Angeles, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 24 ga.—1 to 1499 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.43. **Over 4 in. wide and over 1 in. thick, \$4.95.

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Take it?

RAIN, sleet, dust, dirt and careless handling are hazards of transit beyond your control. Once the shipment leaves your plant, all you can do is hope. But you can control the packaging! Can the wrapping material and methods used by *your shipping department* "take it"?

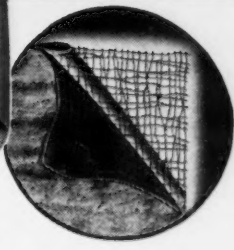
FIBREEN is doing an outstanding protective job for American industry.

Steel mills use it to wrap 10-ton bundles of steel sheets, loaded on open freight cars. Furniture makers find a FIBREEN wrap gives effective shipping protection at a substantial saving in labor and crating. It has reduced claims for damage in transit to a remarkable degree. It protects export shipping — wraps and protects a host of products varying from a box of roses to auto bodies.

Perhaps it can do a job for you. The Sisalkraft Co. has accumulated a wealth of experience and research in packaging and shipping. Write, outlining what you have to protect or ship and your present methods. We will suggest methods others have found effective; and supply, without obligation, enough FIBREEN for a practical trial.



FIBREEN




FIBREEN is 6 ply: TWO layers of strong kraft, reenforced with TWO layers of crossed sisal fibers embedded in TWO layers of special asphalt — all combined under heat and pressure. FIBREEN is pliable and clean — will not scuff — stands an astonishing amount of abuse and exposure. FIBREEN is used either as a wrapping or a lining material.

Soak it—twist it—try to tear it! Only when you get a sample in your own hands can you realize that a *paper* can be so strong — so tough —and impervious to moisture. There is no other material like FIBREEN. Available promptly in rolls and blankets of many widths. Write for sample.

FIBREEN is a product of The Sisalkraft Co. — who are also manufacturers of Sisalkraft, Sisal-X, Sisal-Tape and Copper-Armored Sisalkraft.



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North Atlantic States

• **Standard Machinery Co., Inc.**, 1475 Elmwood Avenue, Providence, R. I., wire-drawing and swaging machinery, presses, tools, etc., has asked bids on general contract for one-story addition, 80 x 120 ft. Cost close to \$60,000 with equipment. Jenks & Ballou, Industrial Trust Building, are architects and engineers.

Commanding Officer, Ordnance Department, Watertown Arsenal, Watertown, Mass., plans expansion in centrifugal casting plant for production of gun tube castings. Fund of \$3,795,134 has been authorized for work, majority of appropriation to be expended for machine tools and other equipment.

Connecticut Telephone & Electric Corp., 70 Britannia Street, Meriden, Conn., telephones and parts, signal apparatus, etc., has let general contract to Romano Rivolta, 152 Washington Avenue, Hamden, Conn., for one-story addition, about 60 x 120 ft. Cost close to \$50,000 with equipment.

Arter Grinding Machine Co., 15 Sagamore Street, Worcester, Mass., is erecting one-story addition, 90 x 100 ft., and making improvements in present plant, for which general contract recently was let to E. Whitehead, Inc., 97 Union Street. Cost over \$50,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, plans expansion in Boston Navy Yard, including new shipways, shops and other structures. Cost about \$10,000,000 including machinery. Similar program will be carried out at Portsmouth, N. H., Navy Yard, to cost approximately \$4,000,000; and at submarine base, New London, Conn., estimated at \$2,000,000. Appropriations are being arranged.

Armour & Co., Inc., Union Stock Yards, Chicago, plans one-story and basement meat-processing and packing plant, about 125 x 240 ft., at Providence, R. I. Cost over \$175,000 with equipment. Bids will be asked soon on general contract.

E. W. Bliss Co., Inc., Fifty-third Street and Second Avenue, Brooklyn, presses, sheet metal-working machinery, dies, etc., has let general contract to Austin Co., Cleveland, for one-story addition, about 100 x 125 ft., to branch plant at 22501 St. Clair Avenue, Cleveland. Cost over \$85,000 with equipment.

Tennessee Copper Co., Inc., 61 Broadway, New York, subsidiary of Miami Copper Co., Inc., same address, has contracted with government for construction of new plant adjoining present works at Copperhill, Tenn., for production of oleum (sulphuric acid compound used for high explosive manufacture), consisting of one and multi-story structures, with tank storage facilities, shops and other buildings. Cost about \$2,375,000 with equipment. Fund in that amount will be secured through War Department for project.

Acco Products, Inc., 24-02 Thirty-ninth Avenue, Long Island City, metal files, paper clips and other metal specialties, has taken out permit for new two-story plant, about 50 x 100 ft., at 39-08 Twenty-fourth Street. Cost over \$65,000 with equipment. John M. Baker, 24-16 Bridge Plaza South, is architect.

American Smelting & Refining Co., 120 Broadway, New York, has asked bids on general contract for initial buildings for new electrolytic zinc refinery at Corpus Christi, Tex., including two storage and distributing buildings, technical and research laboratory, and office. Entire project will cost close to \$5,000,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, plans expansion in Brooklyn Navy Yard, primarily for ship repairs and reconditioning. Fund of \$3,000,000 is being arranged for project.

Frontier Bronze Corp., 818 Elmwood Avenue, Niagara Falls, N. Y., bronze and other metal castings, plans one-story additions for expansion in foundry, pattern shop and other divisions. Cost over \$60,000 with equipment. Will A. Cannon, 2637 Main Street, is architect.

Snyder Mfg. Co., Hamburg Turnpike, Lackawanna, N. Y., steel plate products, plans new one-story plant, 60 x 150 ft., for production of tanks and kindred specialties. Cost close to \$50,000 with equipment.

Greer Brothers, Walck Road, North Tonawanda, N. Y., fiber products, plan establishment of new mill to replace plant at location noted, recently destroyed by fire. Loss about \$50,000 including machinery.

Board of County Freeholders, Court House, Newark, N. J., has authorized call for bids for expansion and improvements in power plant at County penitentiary, Caldwell, including additional equipment. Eppler & Kahrs, 15 Washington Street, Newark, are architects and engineers.

Bakelite Corp., 30 East Forty-second Street, New York, plastic products, has let general contract to Turner Construction Co., 420 Lexington Avenue, for one-story addition, 190 x 240 ft., to plant at Bound Brook, N. J., part to be used for expansion in machine shop, and remainder for storage and distribution. Cost over \$175,000 with equipment. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., plans new one-story shops and other structures. Cost about \$530,000 with equipment. Appropriation in that amount has been authorized.

Henry L. Crowley & Co., Inc., 1 Central Avenue, West Orange, N. J., special resistance and insulation products, plans one-story addition for production of radio parts for government. Fund of \$245,000 will be secured through Defense Plant Corp., Washington.

Merck & Co., Inc., East Lincoln Avenue, Rahway, N. J., industrial and other chemicals, will begin work on three-story and basement boiler plant, 50 x 90 ft., for which general contract recently was let to Salmond-Scrimshaw Construction Co., 526 Elm Street, Arlington, N. J. Cost over \$85,000 with equipment.

War Department, Washington, plans expansion at optical equipment shop at Frankford Arsenal, Philadelphia, comprising new production unit for optical precision equipment for fire control instruments. Fund of \$1,020,000 has been authorized for building and machinery, etc.

Coca-Cola Bottling Co. of Pennsylvania, Inc., Tenth Avenue, Bethlehem, Pa., has let general contract to R. S. Herzog, 1505 Race Street, Philadelphia, for one-story mechanical-bottling, storage and distributing plant, 235 x 250 ft. Cost close to \$175,000 with equipment. Jesse M. Shelton, Bona-Allen Building, Atlanta, Ga., is architect.

Department of Supplies and Purchases, City Hall Annex, Philadelphia, Charles H. Grakelow, director, asks bids until July 22 for corrugated metal pipe (Class 437), hydrant parts (Class 438), fire alarm registers and reels (Class 440).

Pennsylvania Edison Co., Altoona, Pa., plans extensions and improvements in steam-electric generating station at Williamsburg, Pa., including equipment. Extensions also will be made in transmission lines. Cost over \$2,500,000. Burns & Roe, Inc., 233 Broadway, New York, is consulting engineer.

American Boiler Works, Inc., foot of State Street, Erie, Pa., plans new one-story plant at Plum and Cascade Streets. Cost over \$50,000 with equipment.

United States Engineer Office, New Post Office Building, Pittsburgh, asks bids until

July 30 for one rotary oil pump, with flexible coupling, for direct connection to gasoline-electric standby unit at Emsworth locks (Circular 650).

Titan Metal Mfg. Co., Bellefonte, Pa., brass and bronze castings, forgings, etc., has approved plans for one-story addition for expansion in foundry and other divisions. Cost over \$150,000 with equipment.

Stupakoff Ceramic & Mfg. Co., Latrobe, Pa., plans one-story plant for production of radio parts for government, which will furnish fund of about \$321,000, through Defense Plant Corp., Washington, for building and equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until July 21 for drill sockets, hand taps, diestocks, cutting punches, vises, wrenches, pipe taps, machinists' hammers, sledge hammers, rivet sets and headers and other tools (Schedule 5273).

Rustless Iron & Steel Co., 3400 East Chase Street, Baltimore, will begin superstructure soon for one-story addition for wire mill, 60 x 440 ft., to plant on Edison Highway, for which general contract recently was let to Cummins Construction Corp., 803 Cathedral Street. Cost over \$200,000 with equipment.

War Department, Washington, plans one-story assembling shop at Aberdeen Proving Ground, Aberdeen, Md., to handle equipment for which parts are secured from outside plants; also will erect one-story storage and distributing building. Entire project will cost \$425,000 with equipment. Appropriation in that amount has been authorized.

Bureau of Yards and Docks, Navy Department, Washington, plans expansion in San Juan, P. R., dry dock for increased facilities for ship repairs, including mechanical shops, storage and distributing buildings, and other structures. Cost about \$1,250,000 with machinery, including equipment. Appropriation in that amount is being arranged.

The South

• **Tycoon Tackle, Inc.**, Miami, Fla., fishing tackle, reels, etc., plans one-story plant on adjoining site for production of precision instruments for aircraft industry for government. Cost estimated at \$81,650 and fund in that amount will be furnished by Defense Plant Corp., Washington.

John Deere Plow Co., Moline, Ill., agricultural implements, has asked bids on general contract for one-story factory branch, storage and distributing plant at Columbia, S. C. Cost close to \$50,000 with equipment.

War Department, Washington, plans new arsenal for Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., near Hunsville, Ala., to supplement Edgewood station, comprising one and multi-story buildings for special chemical manufacture, loading chemical shells, storage and distribution, laboratories, power house, machine shops, and other departments. Cost about \$40,000,000.

State Division of Purchases and Public Properties, Capitol Building, Frankfort, Ky., Marion C. Howard, director, plans expansion and improvements in boiler plants at State hospitals at Lexington and Hopkinsville, Ky., including new boilers and auxiliary equipment. Fund of over \$150,000 has been arranged for this and other work at institutions.

Wright's Automatic Tobacco Packing Machine Co., Calvin and Mangum Streets, Durham, N. C., has let general contract to C. C. Woods Construction Co., 217 West Geer Street, for one-story addition, 70 x 400 ft., primarily for a machine shop. Cost over \$100,000 with equipment. Atwood & Weeks, Snow Building, are architects.

Bureau of Yards and Docks, Navy Department, Washington, plans expansion at Charles-

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ton, S. C., Navy Yard, for additional ship repair facilities, including machine shops, storage and distributing buildings, and other structures, with cranes, hoists and other mechanical-handling equipment. Cost about \$1,250,000. Appropriation in that amount will be arranged soon. A similar program will be carried out at Norfolk Navy Yard, Portsmouth, Va., to cost about like sum.

Ark-La Electric Co-operative, Inc., Homer, La., recently organized, plans new steam-electric power plant near Homer, to furnish power for electric cooperative distribution associations in parts of Arkansas and Louisiana. Plant will have initial capacity of 10,000-kw., and will use natural gas as fuel. Over 500 miles of transmission lines will be built for supplying power in different districts. Entire project will cost about \$2,850,000. Financing will be carried out through Federal aid and initial appropriation of \$520,000 has been secured to begin work.

Sinclair Refining Co., 840 South Lamar Street, Dallas, Tex., plans new bulk oil storage and distributing plant on local site, including steel tank storage units, pumping station and other facilities. Cost close to \$100,000 with equipment.

Interstate Cotton Oil Refining Co., Sherman, Tex., cottonseed oil products, plans two-story addition for storage and distribution. Cost close to \$45,000 with equipment. James R. Grady, M. & P. Bank Building, is architect.

Central States

● **Champion Machine & Forging Co.,** 3695 East Seventy-eighth Street, Cleveland, drop and upset forgings, has plans by McGeorge & Hargett Co., 9400 Quincy Avenue, for additions for production of steel forgings for aircraft for government, consisting of main one-story unit, 95 x 400 ft., and adjoining building, 120 x 120 ft., for hammer shop, machine shop and other departments. Eight large steam hammers will be installed, with battery of six smaller hammers. Cost about \$699,600 with equipment, fund to be furnished by Defense Plant Corp., Washington.

S. Obermayer Co., 647 Evans Street, Cincinnati, foundry equipment and supplies, plans rebuilding part of six-story plant recently destroyed by fire. Loss over \$100,000 with equipment.

Curtis Key Co., 3219 Carnegie Avenue, Cleveland, key blanks and other locksmiths' products, plans new one-story plant, with office building, totaling 50 x 125 ft. Cost over \$60,000 with equipment. James W. Thomas, 3868 Carnegie Avenue, is architect.

Big Four Railroad, 230 East Ninth Street, Cincinnati, has let general contract to Walsh Construction Co., 19 South LaSalle Street, Chicago, for new engine house, with shop facilities, at Bellefontaine, Ohio. Cost close to \$100,000 with equipment.

Mosler Safe Co., North Third Street, Hamilton, Ohio, will begin superstructure for two one-story additions, 90 x 100 ft., and 40 x 40 ft., for which general contract recently was let to Antenen Engineering Co., East and Hanover Streets. Cost close to \$70,000 with equipment.

Tools & Gages, Inc., 3106 East Sixty-third Street, Cleveland, gages, precision tools, special machinery, etc., has let general contract to Arthur Thomas, 2488 East 127th Street, for one-story addition, 45 x 100 ft. Cost close to \$50,000 with equipment.

State Department of Public Welfare, State Office Building, Columbus, Ohio, Charles L. Sherwood, director, asks bids until July 24 for boiler, stoker and accessory equipment for power house at State hospital, Lima, Ohio.

Public Service Co. of Indiana, Lafayette, Ind., will make extensions for increased power supply for local mill of Aluminum Co. of America, Inc. Work will include new transmission line from generating station at Clinton, Ind., power substation at mill site and other operating facilities. Cost over \$200,000 with equipment.

St. Louis Car Co., 8000 North Broadway, St. Louis, plans three one-story buildings, 240 x 300 ft., 160 x 232 ft., and 75 x 232 ft., at 600 Bittner Street for aircraft parts production,

to be operated by its subsidiary, St. Louis Aircraft Corp., first noted address. Cost close to \$200,000 with equipment.

Cessna Aircraft Co., Wichita, Kan., plans one-story addition to plant near city limits. Cost over \$65,000 with equipment.

B. F. Goodrich Co., Akron, Ohio, automobile tires and tubes, etc., has leased one-story building, 120 x 300 ft., to be erected by North Kansas City Development Co., Fourteenth and Clay Streets, Kansas City, Mo., in North Kansas City industrial district, for factory branch, storage and distributing plant. Cost close to \$100,000 with equipment. Hiram Elliott Construction Co., Armour and Jasper Streets, is general contractor. Keene & Simpson, Land Bank Building, are architects.

Mississippi River Fuel Corp., 407 North Eighth Street, St. Louis, operating natural gas properties, is erecting new compressor station near Poplar Bluff, Mo., for booster service. Cost close to \$160,000 with equipment.

Long Mfg. Division, Borg-Warner Corp., 12501 Dequandre Street, Detroit, automobile radiators, clutches, etc., has let general contract to Alfred A. Smith, Penobscot Building, for one-story addition. Cost over \$60,000 with equipment.

Bohn Aluminum & Brass Corp., Lafayette Building, Detroit, aluminum, brass and bronze castings, forgings, etc., is arranging contract with War Department for construction of new mill for production of virgin aluminum near Camden, Ark. It will include storage and distributing buildings, machine shop, power house, pumping station, power substation and other structures. Fund of about \$45,000,000 will be furnished by Defense Plant Corp., Washington, for land, buildings and machinery.

United States Foundry Corp., Kalamazoo, Mich., iron castings, has asked bids on general contract for one-story addition for expansion. Cost close to \$50,000 with equipment. Stewart-Kingscott Co., Kalamazoo, is architect.

Olds Motor Works Division, General Motors Corp., Lansing, Mich., has let general contract to Christman Co., Lansing, for three-story addition, about 130 x 175 ft., for expansion in sheet metal division. Cost close to \$200,000 with equipment.

St. Claire Tool Co., 621 Beaufait Street, Detroit, plans one-story addition. Cost close to \$45,000 with equipment. H. E. Beyster Corp., General Motors Building, is architect and engineer.

American Brass Co., 174 South Clark Street, Detroit, brass, copper, bronze and other metal products, is erecting one-story addition, for which general contract recently was let to J. A. Utley, 723 East Ten-Mile Road, Royal Oak. Cost over \$75,000 with equipment.

Excelsior Brass Mfg. Co., 217 West Illinois Street, Chicago, general brass goods and kindred metal products, will begin superstructure for new one-story plant at 3452-54 North Knox Avenue, 40 x 100 ft., for which general contract recently was let to Paul Sather, 2825 McLean Avenue. Cost about \$45,000 with equipment.

Deere & Co., Inc., Moline, Ill., agricultural machinery and implements, has let general contract to J. H. Hunzinger & Co., Davenport, Iowa, for two-story addition, 110 x 220 ft. Cost close to \$150,000 with equipment.

Allis-Chalmers Mfg. Co., West Allis, Wis., heavy machinery and parts, has acquired about 20 acres near city limits, Milwaukee, and will erect plant for construction of superchargers for aircraft for government. Cost about \$12,500,000, appropriation in that amount to be secured from government.

American Varnish Co., 1140 North Branch Street, Chicago, paints, oils, varnishes, etc., has let general contract to Rune & Sons, 7660 Stony Island Avenue, for three-story addition, 65 x 85 ft. Cost about \$70,000 with equipment. Engineering Systems, Inc., 221 North LaSalle Street, is architect and engineer.

Town Council, Mallard, Iowa, asks bids until July 22 for equipment for municipal power plant, including two or three diesel engine-generator units, each 50 to 60-kw. capacity, or two such units, 65 to 80-kw. rating, with exciters, fuel oil system, switchboard, cooling distributing system. K. R. Brown, Valley equipment and accessories; also for electrical

distribution system. K. R. Brown, Valley Bank Building, Des Moines, Iowa, is consulting engineer.

Daniel D. Weschler & Sons, 4295 West Burnham Street, Milwaukee, malt products, have let general contract to Jezo Construction Co., 7232 West Greenfield Avenue, West Allis, Wis., for one-story addition to malt house, and improvements in present plant. Cost over \$50,000 with equipment.

Ampco Metal, Inc., 1748 South 38th Street, Milwaukee, is erecting a foundry addition totaling 60,000 sq. ft., which will practically double its present floor space.

Western States

● **Consolidated Aircraft Corp.,** San Diego, Cal., plans expansion for production of military aircraft for government, including one or more one-story units for parts manufacture and assembling. Cost about \$1,759,000, fund in that amount to be furnished by Defense Plant Corp., Washington. Large part of appropriation will be expended for equipment.

Polaris Flight Academy, Lancaster, Cal., Major C. C. Moseley, president, has let general contract to Victor Nelson, 475 Paula Avenue, Glendale, Cal., for new airplane pilots' training school, comprising hangars, machine shops, and other field structures. Cost about \$400,000 with equipment.

Bureau of Reclamation, Old Post Office Building, Sacramento, Cal., asks bids until July 23 for two 200,000-gal. elevated steel water tanks for siding No. 1; one similar tank for siding No. 6; one 15,000-gal. elevated steel water tank for siding No. 2; one 15,000-gal. steel water reservoir for siding No. 4; one 15,000-bbl. oil storage tank for siding No. 1, all for use in connection with relocation of lines of Southern Pacific Railway, between Redding and Delta, Cal., Kennett Division, Central Valley project, Cal. (Specification 973).

Los Angeles Brewing Co., 1910 North Main Street, Los Angeles, has asked bids on general contract for one-story storage and distributing building at 700 Moulton Avenue. Cost close to \$80,000 with equipment. Llewellyn A. Parker, 816 West Fifth Street, is architect.

Interstate Tractor & Equipment Co., 2855 N. W. Front Street, Portland, road and highway equipment, etc., has leased one-story building now in course of erection by Union Pacific Railway at 2681 N. W. Front Street, for storage and distribution. Cost over \$50,000 with equipment. John A. Schrag, 2023 S. E. Seventy-sixth Street, is general contractor.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 22 for one motor-driven plate-bending roll for Puget Sound Navy Yard, Bremerton, Wash. (Schedule 7747); magnet wire for yard at Oakland, Cal. (Schedule 7770); until July 25 for two motor-driven horizontal forging machines for Mare Island Navy Yard, Vallejo, Cal. (Schedule 7723).

Canada

● **National Steel Car Corp., Ltd.,** Kenilworth Avenue North, Hamilton, Ont., has asked bids on general contract for new plant for production of military planes for Dominion government, including parts production and assembling. Cost over \$2,000,000 with equipment.

Carborundum Co., Ltd., Stanley Street, Niagara Falls, Ont., abrasive products, etc., has approved plans for one-story addition, 90 x 250 ft., for a furnace building. Cost over \$350,000 with equipment.

Canadian Westinghouse Co., Ltd., 286-58 Sanford Avenue North, Hamilton, Ont., has let general contract to W. H. Yates Construction Co., Ltd., 400 Wellington Street North, for one-story addition, 110 x 150 ft. Cost close to \$160,000 with equipment.

Dominion Tar & Chemical Co., Ltd., Commissioner Street, Toronto, has approved plans for one and multi-story addition for increased production. Cost over \$200,000 with equipment.